

STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
DEPARTMENT OF CONSERVATION  
DIVISION OF FORESTRY



*The  
State  
Forester's*

**1970 REPORT**





RONALD REAGAN  
*Governor*

NORMAN B. LIVERMORE, JR.  
*Secretary for Resources  
The Resources Agency*

JAMES G. STEARNS  
*Director  
Department of Conservation*

## **THE STATE FORESTER'S 1970 REPORT**



**L.A. MORAN**  
*State Forester*

THE CALIFORNIA STATE BOARD OF FORESTRY

*Whitford B. Carter, Chairman*

**E. Lamar Johnston**

**Howard K. Nakae**

**Ray Crane**

**Waller H. Reed**

**Franklin L. Barnes, Jr.**

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SACRAMENTO, CALIFORNIA  
**1971**



EDWARD REAGAN  
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WILLIAM G. STEARNS  
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# THE STATE FORESTER'S 1970 REPORT



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SACRAMENTO, CALIFORNIA  
1971



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*Cover: Retired State Forester Francis H. Raymond receives Silver Smokey Award from National Association of State Foresters President John Tiller in Santa Fe, New Mexico, September 30, 1970, U. S. Forest Service photo.*

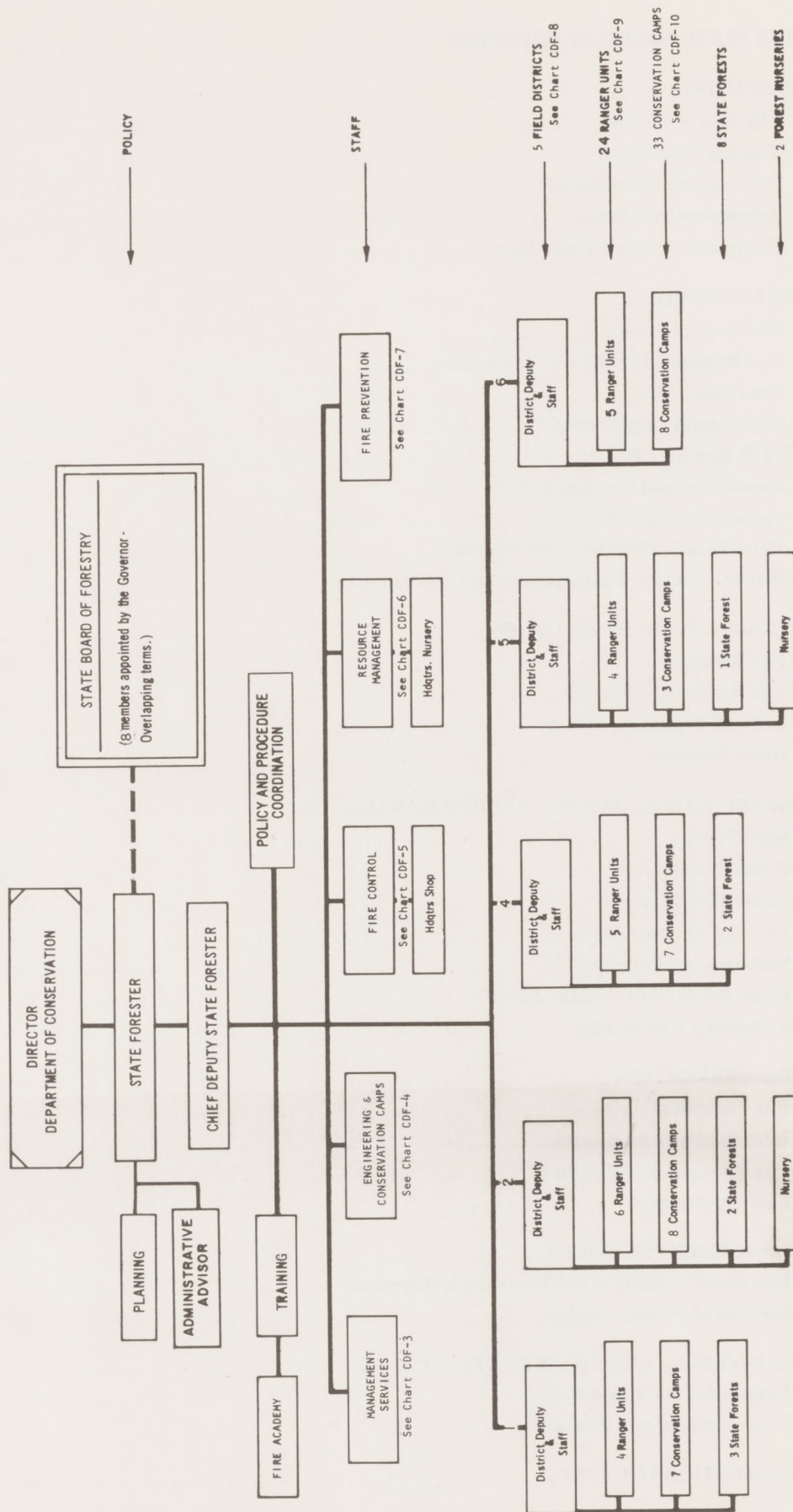


# DIVISION OF FORESTRY

## DEPARTMENT OF CONSERVATION

### THE RESOURCES AGENCY

#### STATE OF CALIFORNIA





## THE STATE FORESTER'S 1970 REPORT

### THE STATE BOARD OF FORESTRY

The California State Board of Forestry is constituted of eight members, appointed by the Governor. The Board represents interests of the state in acquiring and managing state forests, and in federal land matters related to forestry. Protection of the State's interests in forest resources on private lands also is a responsibility of the Board. As a policy-making body the Board develops and maintains a forest policy adequate for the state, and develops policies for general guidance of the State Forester in his administration of the Division of Forestry, under supervision of the Director of the Department of Conservation.

Eleven regular monthly meetings of the Board of Forestry were held in 1970, seven of which were in Sacramento and four in other parts of the State where field trips were conducted to acquaint the Board members with local problems and needs. These field trips also provide them with firsthand information on current conditions in the wildland areas and the results of the disastrous fires in the southern part of the State. In addition to regular Board work, individual members attended meetings and conferences on forestry and conservation matters throughout the State and also participated in Timber Maturity Board meetings in several counties to assist in determining the maturity of timber on cutover lands.

In June, the Board accepted the resignation of F. H. Raymond as Secretary of the Board and appointed Chief Deputy L. A. Moran as secretary. The Board also requested an examination be held to fill the position of State Forester to succeed F. H. Raymond upon his retirement, August, 1970.

On August 5, Board member Paul Aurignac was killed in a plane accident on his ranch near San Ardo. Mr. Aurignac was appointed to the Board in 1960 and represented the range livestock industry.

In order to meet the changing conditions in the Tahoe Basin area and the potential resulting challenge to the current South Sierra Forest Practice rules, the Board requested the South Sierra Forest Practice Committee to hold public hearings and review the South Sierra Forest Practice rules for any necessary amendments.

During 1970 the Board received requests for approval of 30 new Alternate Plans of Forest Practice and four amendments to plans previously approved. Hearings were held and approval given to these new plans and the amendments.

A proposal by the Legislative Analyst to charge fees for administration of the Forest Practice Act by the Division of Forestry was referred to the Board's Editorial Committee for study. Subsequently, the Committee prepared a report and resolution for the Board's consideration. The Board adopted this resolution opposing the proposal and so informed the Chairmen of the Legislative Committees involved and the Legislative Analyst.

Following a hearing on the matter, the Board adopted regulations to permit prospecting for geothermal resources on State Forests, in conformance with requirements of State Lands Commission.

In accordance with the plan developed for methodical review of the State Forester's Fire Plan, the Board held reviews of the Plan at four separate meetings and by resolution accepted and approved the Plan at the October meeting.

During the year the Board reviewed the Division of Forestry budget and other legislation related to forestry matters.

### • EXECUTIVE •

#### The Year in Review

During 1970, State Forester Raymond:

- Aided in ceremonies, with the Department of the Youth Authority, local officials and citizens in dedicating the newly replaced facilities of the Pine Grove Youth Conservation Camp in Amador County.
- Chaired the annual meetings of the 400-member California State Fire Prevention Committee in Los Angeles and San Francisco; and participated in sessions of the national Cooperative Forest Fire Prevention Committee made up of the National Association of State Foresters, the United States Forest Service and the National Advertising Council, held in Hollywood, California.
- Initiated action through the California State Board of Forestry to have the Redwood District Forest Practice Committee hold hearings in the southern portion of that District to determine and promulgate more stringent forest practice regulations in that area, which were subsequently adopted by the Board.
- Served as member of the President's Council on Science and Technology.
- Obtained special legislation for and concluded arrangements to permit a long term lease for the recreational facilities of the Mendocino Woodlands with a non-profit organization specializing in helping disadvantaged youth.
- Attended numerous meetings with cooperating organizations, associations and agencies, such as: The California Cattlemen's Association, the California Wool Growers Association, the Western Wood Products Association, the National Association of Soil Conservation Districts, the California Forest Protective Association, the California Rural Fire Association, the Society of American Foresters, and the Board of Directors of the California Division of Forestry Employees Association.



- Joined in high level staff meetings with the Regional Forester and the Director of the Pacific Southwest Forest and Range Experiment Station, United States Forest Service, for review of programs and inter-agency cooperation.
- Met in annual program review with the Chiefs of the five Contract County Fire Departments.
- Following an announcement that he would retire at the end of August, 1970, he resigned as Executive Secretary to the California State Board of Forestry on July 16, having filled that office since September, 1953. He retired as State Forester effective August 31, with more than 39 years of service in the California Division of Forestry.
- Following his retirement, Mr. Raymond attended the Annual Meeting of the National Association of State Foresters in Santa Fe, New Mexico, where he was presented the Silver Smokey Award for contributions to forest fire prevention.

### Historical Landmark Dedicated

State Forester Raymond, Resources Secretary Norman B. Livermore, Jr., and retired Assistant Executive Officer C. Raymond Clar participated in dedication ceremonies for the Cooper Mill Site on the Russian River.

Captain John B. Cooper arrived in California in 1823 as Master of a trading ship. In 1834 he invested \$10,000 - a great deal of money at that time - in constructing the first commercial sawmill in the State. It is believed that the saw was a straight ripsaw in a frame which moved up and down. At most, a couple of thousand feet of lumber a day was maximum. No certain evidence has come to light regarding how much lumber was actually produced before the mill was destroyed by a flood during the winter of 1841-42. The historic value of this mill site became recognized through the research efforts of C. Raymond Clar. All that remains of the site today is a stubble of redwood planks used to build the dam for the mill pond. Interestingly, this wooden material is heavily eroded but sound.



Resources Secretary Norman B. Livermore, Jr., and retired Executive Officer C. Raymond Clar.

### Training Activities

Major Division training activities continued to be centered at the Division Fire Academy at Ione. Additions to the special fire training area included the development of an approved firing range for use by students in Basic Peace Officer Training classes. All facilities planned for the special fire training area have now been completed and were in full use by Fire Apparatus Engineer classes during the training year.

A one-week Extended Attack Fire Management Course designed for Assistant State Forest Rangers was developed during the year through a team effort of Fire Academy staff and field unit administrators. Two pilot sessions were held and continuing classes at the Academy for Assistant Ranger personnel in the Fire Control field are planned for the coming year. Initial Attack Fire Management Training, initially conducted at the Academy is now being carried on at the District level using Ranger Unit instructors trained at the Fire Academy. Initial Attack Fire Management Instructor training is continuing.

Development of a special joint supervisory training course for Fire Crew Foremen and Correctional Officers was initiated and pilot courses are scheduled for the Spring of 1971.

Highlights of Academy activities for the year include five standard five-week basic fire control courses - a total of 2,625 man-days of instruction; two ten-day seasonal Fire Apparatus Engineer courses, 300 man-days; two automotive tune-up courses for HFEO's, 175 man-days; Initial Attack Fire Management instructor training, 96 man-days; Extended Attack Fire Management training, 96 man-days; Plans Boss Training, 96 man-days; Facility Maintenance Training, 77 man-days; Fire Information Officer Training, 100 man-days; Law Enforcement Training, 1,875 man-days; a grand total of 5,440 man-days of training at the Fire Academy.

The scheduled five-week Heavy Fire Equipment Operator course was canceled for budgetary reasons. The Academy staff continued the field survey of fire training effectiveness for graduates of the preceding year's classes to insure that procedures taught continue to reflect current fire control needs. The Academy staff also participated during the fire season in intensive field studies on the use of video equipment as a fire management tool.

Specialized training assignments for Division personnel included participation in the following programs sponsored by other public agencies and private concerns: California Fire Services Staff and Command school, Arson and Fire Seminar, Fire Prevention Seminar, Safety Management, Rangemaster Training, Artificial Forest Regeneration, Heating and Air Conditioning Maintenance, Report Writing and Management courses at the State Personnel Board Management Institute.

Total Division training effort by program, including training carried on at the Academy, District and Ranger Units, for both permanent and seasonal personnel is as follows: Fire Prevention, 3,815 man-days; Fire Control-State Responsibility, 27,580 man-days; Fire Protection-Local Government, 13,655 man-days; Forest, Range and Watershed Management, 628 man-days; Conservation Camps, 5,078 man-days; General Support, 8,000 man-days; Civil Defense and other Emergencies, 5,078 man-days; Grand Total, 60,739 man-days.



**Fire Prevention Training**—The Fire Prevention Training year ended with some important milestones.

The first Fire Prevention Education class was held at the Academy with 28 students completing the course. The instructor staff was composed of a statewide group of prevention specialists.

The basic Peace Officer course of six weeks was modified slightly to come into full compliance with the standards set by The commission on Peace Officer's Standards and Training (P.O.S.T.). In 1969 the Division filed an agreement with P.O.S.T. to comply with the standards of selection and training of peace officers and with P.O.S.T. approval of the basic P.O.T. course, Division peace officers became eligible for the specialized Law Enforcement Certification program.

The Division entered into a contract with San Joaquin Delta College to operate the basic Peace Officer Training as an extension course in the College Police Science program. For each two week increment of the six week basic P.O.T. course successfully completed, the Division employee student receives 4 semester units of credit, a total of 12 units for the course.

During 1970, 26 students completed the basic course, including one employee from the U. S. Bureau of Land Management, 70 students, including 3 B.L.M. employees and one National Park Service employee, completed 160 hours of the basic course.

Fifty-three students completed the first 80 hours of the basic course, including 3 B.L.M. employees, one N.P.S. employee, one U. S. Forest Service employee and one man from the Alaska State Division of Forestry. Twenty-five students completed a 5 day course of advanced Peace Officer Training, and 22 students completed a one week course in Forest Practice Act Enforcement.

The firearms training range is nearly completed which then will delete the cost in travel and time lost previously moving the classes to the Stockton Police Department Range for firearms training.

Approximately 1,865 man days of Fire Prevention training was completed during the year. This was approximately 875 man days less than it would have been if it had not been necessary to cancel classes because of fire occurrence.

Four of the Division instructors in the Fire Prevention Training program have teaching credentials. We have made arrangements for the balance of the instructors to attend a course in teaching techniques early in 1971. This will qualify them for teaching credentials. As a bonus for this effort to have all Division instructors in the Fire Prevention Training program credentialed, the entire Academy staff, as well as a number of Sacramento staff personnel, will also attend and become eligible for credentials.

#### Planning Coordinator

1970 was a year of cooperative, intergovernmental studies for the Planning Coordinator. Many of the studies were in response to nationwide concerns over land use planning, pollution of air, water and living space and the fantastic new public awareness of ecology and the environment.

A major portion of the year was spent working with an interdepartmental team (Fish and Game, Water Resources, Parks and Recreation, Navigation and Ocean

Development, and Conservation) on the California Protected Waterways Plan Program. This Study, in response to Chapter 1278 of the Statutes of 1968 declares that it is State policy to conserve those waterways of the State possessed of extraordinary scenic, fishery, wildlife or outdoor recreation values. Waterways are broadly defined to include streams, rivers, channels, lakes, reservoirs, bays, estuaries, marshes, wetlands and lagoons. The Protected Waterways Plan is to include identification of extraordinary waterways, the public interest in waterways, the threats to resources of the waterways and proposed standards and actions to protect and conserve the values of waterways as well as identification of waterways that merit priority action for conservation. The study team will complete its work early in 1971 and will submit to the Legislature a proposed California Protected Waterways Plan pinpointing the problems of waterway conservation and suggesting methods of conserving and protecting waterways.

The study of the dispatch system conducted with System Development Corporation was completed. This study described and probed the present system of fire and emergency dispatching and investigated the possibility of automation or computerization of dispatch functions. Conclusions were that computerization is not presently feasible, but that extensive automation and electronic data processing of dispatch functions will be necessary in the near future due to overloading of the present dispatch system resulting from the ever-increasing number of fire and emergency calls and responses. Several recommendations were made by the contractor. An internal group was set up to implement the recommendations which will lead to further standardization and semi-automatic processes in dispatching. Automation can then be reconsidered in the 1975-80 time frame. The Fire Information Reporting System (FIRES) study was not as active this year because of involvement with the dispatching study.

The Council on Intergovernmental Relations, a research group in the Lieutenant Governor's Office, studied relations among fire departments at local, state, and federal levels. Several inputs were made to this study.

A grant was received by the University of California (Davis) from the U. S. Forest Service to conduct a series of land use planning seminars. The format for the seminars was planned during the latter part of 1970. They are to be "awareness" type meetings including university, Division of Forestry, U. S. Forest Service, and county government administrators, commissioners and planners. The seminars will be held early in 1971.

Work continued with the Sacramento Regional Area Planning Commission. SRAPC has received a planning grant to study the idea of a "Gold Rush Parkway" to provide scenic and recreation, tourism routes through Sacramento, El Dorado, and Placer counties. This will impact Division of Forestry and Department of Conservation programs and expertise within the department can be used cooperatively in the Parkway Study.

The Planning coordinator served as President of the California Alumni Foresters in 1970.

The State Forester's Fire Protection Plan was presented to the Board of Forestry and studied by the Board at its meetings throughout the year. The Plan was formally re-adopted after editorial changes at the October 22 Board meeting. The new plan includes



several elements not considered in previous plans such as Air Attack and Conservation Camps. The new Plan will form an excellent base for continued fire protection planning which is becoming more sophisticated as to standards, methods, and needs as time goes on. The Plan follows the format of program budgeting which helps tie together dollar needs, physical plant, unit costs and aids understanding of the rationale and economic and philosophical theory of wildland fire protection.

Meeting of a confederation of groups and individuals interested in protecting some of California's distinct natural areas and ecological niches were attended.

Several national problems were the subject of study, review and the preparation of State "position papers". The proposed federal National Timber Supply Act created much interest and concern. The proposed Act was defeated in a procedural move in the House of Representatives. However, succeeding legislation has been drafted. The topic of levels of multiple use management including timber management on the National Forests is both controversial and very important to California. About half of the timberland in the State is in National Forests and the level of timber cut and management is of profound importance to the State.

Completion of the Public Land Law Review Commission studies and publication of the final report "One Third of the Nation's Land" caused a flurry of activity. Public land ownership makes up over 45 percent of California's landscape. The importance of public lands to the State's welfare is obvious. The study forced a hard look at Federal-State relations and land and natural resource policies. Proposals of the Review Commission and its various study contractors were studied and comments forwarded to the Commission through the Secretary for Resources. Implementation of Land Law Review Commission Studies by proposed federal legislation will be a subject of continued future interest.

Increased concern with environmental and ecologic issues on the part of the general public as well as the executive, legislative and judicial branches of government led to several assignments during the year. A talk and discussion of cost-benefit criteria and problems was presented to the Board of Forestry. The impact of the new State Environmental Quality Act of 1970 was studied. Needs of the Lake Tahoe area for forestry knowledge to meet environmental problems resulted in the hiring of a Senior Forester to work with planning and environmental groups at the Lake. The Planning Coordinator helped draw up the specifications and proposed working arrangements for this position which is funded from a U. S. Forest Service grant. Several speeches were made to groups interested in the interaction of social, ecological, economic and population phenomena. Economic development and the environment were stressed in several marketing, regional economic development, and environmental impact studies and reviews.

#### Administrative Advisor

Added vigor to enforcement of the Forest Practice Act is maintained with consequential beneficial results in better timber production and maintenance of ecological balance. In addition to filing actions before the State Board of Forestry, effective use of the injunction pro-

cesses were made with most satisfactory results.

Consultations with district attorneys in counties which had been reluctant to prosecute criminal violations of the Forest Practice Act has resulted in their cooperation and realization that the Act is not a whimsy to be enforced only as against a select few, but is an all encompassing vehicle for protection of valuable timber resources.

This year may set a record in recovery of costs expended by the State in fighting negligently set fires. Recovery of suppression costs is principally an enforcement tool. The objective is to reduce the area of negligence and carelessness through dollar hurt and thereby lessen the number of fire starts with consequential curtailing of the number of recovery costs.

Participation in numerous meetings in Santa Cruz and San Mateo County hearings gave greater insight to the needs for special rules for the southern area of the Redwood Forest District. Special urgency legislation was enacted enabling the California State Board of Forestry to make temporary rules when an emergency situation exists.

Numerous legislative proposals have been drafted and submitted for the purpose of facilitating enforcement of the Forest Practice Act and to give greater protection to productive timberlands.

Power lines' regulations have been updated to conform to changing conditions and experience.

Geothermal regulations were enacted to give added protection to State Forests should geothermal development take place therein.

Conflicting ideas had existed between California Division of Forestry and the U. S. Department of Interior relating to the right of California Division of Forestry citing Indians for law violations on Indian lands. After an interchange of legal opinions and a series of meetings, most differences have been resolved. A recent court decision fortified our position and further assures our right to enforce laws on Indian lands.

Field personnel, district headquarters, headquarters' staff, and the State Forester have been given legal opinions on various questions. Following are a sampling of subjects on which opinions have been given:

*Requirement of State employees and Board members to disclose holdings.*

*Right of State employee to participate in, campaign for, or endorse a candidate for public office.*

*Applicability of the Hatch Act to Board members.*

*Right of a ranger to dismiss members of a volunteer fire department.*

*Incompatible employment of State employees.*

*Effect of newly enacted Forest Practice Rules on existing contracts.*

*Jurisdiction for issuing of burning permits.*

*Search of employees' lockers for contraband.*

*Legality of removing bodies in the absence of the coroner.*

*Effect of zoning ordinances on logging.*

*Authority to delegate peace officers' appointments to the U. S. Forestry service.*

*Workmen's Compensation payments to wards of California Youth Authority.*

*Integration of Division of Highways and California Division of Forestry Conservation Camps.*



*Confidentiality of Forest Practice Inspection Reports.*  
*Responsibility of the State for fires related to highways running through Federal lands.*  
*Qualifications of firemen as peace officers.*  
*Responsibility of California Division of Forestry personnel for search and disposal of explosives.*

## Safety and Accident Prevention

Personnel safety equipment is most important in providing protection for the hazardous operations of firefighting. At present, standards for goggles are being developed. Research is being conducted to develop flame resistant and insulated clothing.

Work gloves are needed to prevent injuries while engaged in project and maintenance work. Gloves have been found to be necessary in reducing serious burns during fire suppression. During last year, two men who were fighting fires without hand protection had their hands burned so seriously the tendons were destroyed, resulting in useless "clawed" fingers.

Another matter of concern results from the increase in structural firefighting. Undoubtedly this kind of work will further increase each year as more people move into areas under State protection. Protective equipment required for persons fighting structural fires is different from that used in wildland fires: turn-out coats, trousers, and boots.

Puncture wounds from nails and broken glass have accounted for many injuries to the feet in structural firefighting, indicating the need for turn-out boots. One district is in the process of providing lightweight turn-out coats and boots with metal inner soles for all Schedule "B" fire fighters.

There was no marked improvement in the Division's safety record during 1970, such as was produced during previous years. The program has been moving along on more or less of a plateau (20.7 lost time injuries per million hours in 1969 compared to 21.6 in 1970). For example, this is the first year since 1966 that the total number of injuries increased--from 262 in 1969 to 280 in 1970. Two principal reasons are apparent for the increase in total injuries:

- (1) Lack of safety equipment to reduce or prevent injuries, and
- (2) Less than satisfactory involvement of first line supervisors in enforcing safe work practices.

### YEARLY INJURY RATE OF DIVISION OF FORESTRY PERSONNEL

Calendar Year	"Lost-Time" Injuries (Per Million Man-hours Worked)
1964	44.23
1965	53.71
1966	42.99
1967	45.9
1968	22.1
1969	21.6
1970	20.7

Much safety equipment was deleted from the 1970-71 budget, due to tight fiscal conditions. This problem should be partially solved during the next fiscal year: safety equipment will appear as a line item in the budget.

To reduce injuries takes more than just providing protective equipment. It takes concerted effort on the part of line management to see that regulations--and safe practices--concerning use of protective equipment are enforced.

The first line supervisor is the most important person in preventing accidents, because about 95 percent of injuries occur at the working crew level. It is imperative, therefore, that management give a great deal of attention and support to this level of supervision. Results can be accomplished through:

Indoctrinating new supervisors about their responsibilities prior to supervisorial assignment.

Training first line supervisors--Assistant Rangers, Fire Captains, and Fire Apparatus Engineers--in the basics of good management techniques routinely.

Establishing safety rules and regulations.

Rewarding safe practices of work groups.

Enforcing safe work practices among supervisors, by managers.

Disciplinary measures for willful negligence in supervision before and when an accident occurs.

One thing is certain--first line supervisors get "turned on and tuned in" only when they are convinced that management expects improvement in their accident experience through positive supervisorial action.

The new law providing for retirement at age 55 should result in a more viable work force, thereby reducing injuries, particularly those to joints--back, knees, and shoulders. Part of the early retirement program is development of standards for retention for employees by age group in various work classifications.

Pre-employment testing and physical examination standards have been submitted to the State Personnel Board for review--hopefully they will be incorporated into the employee procurement process by next year.

Rehabilitation of permanently injured employees is progressing. It is hoped that each district will become more involved in discussions of routine injury-illness cases with managers of both the State Compensation Insurance Fund and the Department of Rehabilitation. Such discussions contribute measurably to employee good will and reduce costly litigation through the Workmen's Compensation Appeals Board.

It is difficult to measure costs or benefits of accident prevention. However, in all large, profit-oriented enterprises it has received priority consideration. In fact, some firms claim accident prevention programs have made the difference between operating in the black instead of the red.

It is interesting to note that in a few instances, where an employee was seriously injured, costs of providing safety equipment to prevent such injuries for all personnel of the Division would have been less than the



medical and compensation costs (direct costs) for a single injury.

Workmen's compensation costs for the Division of Forestry during the last four years are shown in the table. To get an idea of what these direct costs represent, it is conservatively estimated that the indirect costs are **four times as much**—and in emergency work such as that of Forestry, they can be as high as **ten times as much**. If we use the conservative four-to-one ratio, then total cost was at least \$2,021,000 for the 1969-70 fiscal year.

Fiscal Year	Medical and Compensation Costs (Direct Costs)
1966-67	\$430,692
1967-68	409,852
1968-69	381,182
1969-70	404,143

With inflation rampant and social benefits rising, managers in government cannot afford to treat accident prevention lightly, or as just another employee benefit. To put it simply: accident prevention is **good business**.

## • FIRE CONTROL •

The primary objective of the fire control program is the control of wildfires on state responsibility land, holding damages at a level such that the yield of economic goods and social benefits from the wildlands will not be impaired. Principal program responsibilities are fire control planning and operations, civil defense and other emergency operations, and statewide dispatching of forces.

### Fire Control Section

The State Forester has delegated authority for fire control to a unit of his staff known as the "Fire Control Section." Under the direction of a Deputy State Forester this section has staff responsibility for the following functions:

*Fire control operations within the Division of Forestry.*

*Cooperative fire control operations.*

*Dispatch and communications.*

*Air attack operations.*

*Mobile equipment management.*

*Fire protection analysis and planning.*

*Operational research.*

### The 1970 Fire Season was Characterized by:

*A dry spring following a winter of barely sufficient precipitation.*

*A uniformly hot dry summer.*

*Fire occurrence up to a new record high.*

*Thunderstorm activity below normal, except in Southern California.*

*A protracted period of statewide extreme fire danger beginning the latter part of September.*

*Several severe Santa Ana winds in Southern California in September, October, and November.*

*The wind driven, multiple large fire situation in Southern California in late September.*

*A dramatic end to the Southern California fire season by record setting rainfall the last few days of November.*

The unfavorable 1970 fire weather was reflected in the high occurrence and area burned figures for the year. Occurrence in the Division's direct protection area was 8,823 fires, a record high, and up 26% from the recent 5-year average. Direct protection area burned was 223,000 acres, which is 59% greater than the recent 5-year average and is the largest area burned since 1965.

### Fire Weather and the 1970 Fire Season

1970 was a distinctly unfavorable year from the standpoint of fire weather. It was also a year of many extremes and new climatic records.

The year began with a moisture deficit, but heavy rains in January brought the rainfall situation to above normal. During this time Blue Canyon set a new record for its monthly January total precipitation - 34 inches. February was a poor rainfall month but March brought fairly good amounts with a concentration in Southern California. Thereafter, except for small amounts of rain in April and in June, and some moist summertime thunderstorms in Southern California, the State received no rainfall of consequence until the fall storms began.

Other pre-season conditions were also unfavorable. Severe drying occurred as early as March when there was one period of seven consecutive north wind days. By the middle of March there was no snow below 6,000 feet in the Sierra. Rangeland grasses headed two weeks early and were beginning to cure by early April. May was a warm month and in Sacramento it was the warmest May on record.

The summer months were uniformly hot and dry. There were no exceptional weather occurrences until the windy patterns of early fall arrived. The frequency of the north wind in the northern Districts was about normal but in Southern California the dreaded Santa Ana made its first appearance rather early (late September) and there were several cases of this wind pattern before the season ended. The fall rains were a little late in



arriving (mid-October) but once started continued in quantity in the northern Districts. Southern California had to endure severe fire weather through November until heavy rains terminated their fire season on December 1.

Fire danger, except for a brief quiet period in June, was almost uniformly in the higher ranges throughout the season. Accumulated fire weather severity in most areas climbed to above normal early in the season and continued to increase its lead. In twelve sample areas which are monitored for this purpose, the total fire weather season severity never dropped below normal but climbed steadily to 130% of normal by early October. This coincides with the period of intense fire activity that began late in September. During the last ten days of September the entire state experienced extreme fire danger with many areas as much as three times the normal level. The total statewide fire weather severity for June through October, as represented by these twelve sample areas, shows 1970 to be first in order of severity in the ten year period 1961-1970, dropping the notorious 1961 out of first place.

#### *The Crisis Period - September 22 to October 4*

The 1970 fire season again demonstrated that during the period of a few days, severe fire weather and a few large fires in combination can create what have been known as "crisis periods", during which a few conflagration fires burn large areas and cause major damages.

During the period September 22 - October 4, California experienced statewide extreme fire danger, with high wind and temperatures, and low relative humidity and fuel moisture. In Southern California, strong Santa Ana winds promoted fire ignition and rapid fire spread which contributed to numerous disaster fires. During this period, 32 large fires (300 acres +) burned approximately 540,000 acres on lands protected by all fire protection jurisdictions. Great resource and property damages were suffered, and 14 persons lost their lives. A fire problem of this magnitude has not occurred in California in recent history.

Twelve of the 32 large fires exceeded 5,000 acres in size. Of these 12, eight exceed 20,000 acres in size, and two of these burned more than 100,000 acres each. Although the 175,000 acre Laguna Fire came close to breaking the state's largest wildland fire record, the Matilija fire of 1932 on the Los Padres National Forest, which burned 219,000 acres remains California's largest single fire.

Chronologically, the large fires occurred as follows: on Tuesday, September 22, four; on Friday, September 25, nine; on Saturday, September 26, nine; on Sunday, September 27, six; and Monday, September 28, three. The last large fire was experienced in the North Coast District on Thursday, October 1.

Indicative of burning conditions at the start of the period, the Fish Fire east of Oakland, on September 22, although covering only 230 acres, destroyed 36 residences and damaged 37 for a three million dollar structural loss. On the same day, a structural fire near Rio Nido in Sonoma County caused a 20 acre fire which destroyed nine structures. The 3,500 acre Clark Butte fire near Ettersburg in western Humboldt County, which also began on September 22, had a large number of per-

sonnel committed for mop-up and patrol when the severe Southern California fires began on Friday, September 25.

During the 13-day disaster period, 434 forest fires occurred on lands protected by the Division of Forestry. It is a credit to the fire control organization and their cooperators that only a few (14) of the fire starts escaped control and became major fires. In recognition of the heavy commitment of forces to going fires, each unit took special measures in an effort to minimize new conflagrations. During this period, 142,550 acres were burned on lands protected by the Division of Forestry.

During this period, the Division of Forestry utilized a wide variety of resources to meet the problem, and took various measures to insure that not only could going fires be dealt with, but forces be available for initial attack on new fires, and to minimize the potentials for recurring large fires.

On September 22, in recognition of the severe fire weather, all days off for Division of Forestry personnel were cancelled and off-duty personnel recalled. This situation continued until Monday, October 5. Burning permits were cancelled in the North Coast and the Central Coast Districts on September 22, and in the balance of the Districts on September 27. Burning permit suspensions were lifted on October 5.

Early in the afternoon on September 25, supporting forces were dispatched to Southern California to lend assistance to both the Division of Forestry and to the county fire departments of Los Angeles and Ventura. In addition, personnel were dispatched to assist the Kern County Fire Department on the Rankin Ranch Fire. At the peak of activity, 76 firetrucks, 31 conservation camp crews, and 139 overhead were serving in Southern California from the other five districts, and 28 conservation camp crews were assisting the Kern County Fire Department on both the Rankin Ranch and Red Mountain Fires.

In addition to the conservation camp crews, maximum assistance was received from the Department of Corrections. Two hundred inmates from the conservation center at Susanville; 236 from the conservation center at Sonora; 115 from the Southern Conservation Center at Chino; and 40 from Tehachapi were utilized on fires in Southern California, and on the Buckeye Fire in Monterey County.

On the evening of Friday, September 25, the Governor applied for federal assistance under the provisions of Public Law 91-79. This application was approved by the Director of the Office of Emergency Planning in Washington Saturday morning. As substantial damages became evident, application for federal assistance under Public Law 875 was requested; and the counties of Alameda, Kern, Ventura, Los Angeles, San Bernardino and San Diego were declared disaster areas eligible for federal assistance.

Heavy demands were made on the State Military Department; and at the peak of activity, they had committed to the Forest Service and the Division of Forestry, 227 vehicles, six bulldozers, one observation helicopter, and 425 men.

Approval of federal disaster request applications authorized substantial federal assistance, and to meet new fire problems, 400 out-of-state Indian Crewmen were ordered through the U. S. Forest Service on



September 26. Staging areas for these and other personnel were established at a CYA facility at Stockton and at the Don Lugo Conservation Camp in Southern California.

To bolster initial attack capability in Northern California, the State Military Department and the Federal Military, including Army, Navy and Marine representatives, were requested to place military helicopters at selected locations in Northern California to move conservation camp crews to new fire starts. The military was most cooperative, and helicopters of both 10 and 13 man capacity, were located at Healdsburg, Howard Forest, Eel River Conservation Camp, Konoti Conservation Camp, Redding Airport, Auburn CDF Headquarters, Columbia Air Attack Base, and Stockton Airport. A total of 13 helicopters were involved at the peak of this activity. In addition, some Marine Corps Helicopters were used in Southern California. The U. S. Navy furnished hand tool crews for the Laguna Fire, and both the Navy and Marine Corps furnished a variety of equipment to assist in the Southern California fire control effort.

To maximize the use of air tankers, establish priorities and meet new fire problems, air attack operations were centralized at several different locations in cooperation with the U. S. Forest Service.

Ranger Units and Districts made numerous contacts with timber industry, ranchers, public utilities and county governments to insure that these resources would be available if the need arose. The timber industry made substantial contributions in the control of the 2,200 acre Camp Grant Fire northeast of Weott.

Early in the fire activity, the Division established close liaison with representatives of the Office of Emergency Services. Substantial use was made of apparatus owned by the Office of Emergency Services and numerous cities and fire districts.

Through the master mutual aid system, the movement of OES State-owned firetrucks was accomplished efficiently and effectively. During the declared disaster period September 25 through October 5, ninety-two OES firetrucks were dispatched for fire control activities. In addition 3 service vans, 1 rescue truck, 4 communication vans and 8 miscellaneous equipment were utilized.

OES firetrucks were manned by 276 local fire department personnel. Other personnel involved in the operation included 7 from the State Fire Marshal's Office operating communication and service units, and 12 chief officers from local departments who served as task force commanders for groups of OES firetrucks. The OES firetrucks accumulated over 7,000 hours of work during the period.

Fire information offices were established at various locations close to the fire activity, and information transmitted to a central fire information office in Sacramento, adjacent to the Division's Dispatch and Communications Center. This proved to be a most effective operation and permitted rapid dissemination of fire information to news media nationwide.

Although substantial acreages were lost and damages were heavy, California fire protection agencies have learned from past experiences. They have developed plans and cooperative relationships to muster total resources in a situation as was recently experienced, and in general, the system and the plans did work as

intended. If substantial efforts had not been expended in developing plans to meet the conflagration fire, the losses would have been much greater.

#### Fire Control Organization

In 1970 the Division's fire control organization included:

*235 initial attack fire crews operating 376 firetrucks.*

*58 Initial attack bulldozer and transport units.*

*2 helitack crews.*

*21 air tankers operating from 12 air bases.*

*4 aerial fire detection patrols.*

*78 forest fire lookouts.*

*33 conservation camps providing 128 inmate and ward crews of about 15 men each.*

*28 Ranger Unit headquarters providing administrative, logistic, and dispatching support for the fire control organization.*

The State Forester's Fire Protection Plan was revised extensively in 1969 and during 1970 the revised plan was reviewed in detail and approved by the State Board of Forestry. On an overall basis, the new plan calls for an increase of about 50% in the Division's fire protection capability.

The major change in protection area during the year was the Westwood-Almanor USFS-CDF protection boundary adjustment. This adjustment added about 145,000 acres to the direct protection area of the California Division of Forestry. A new State crew was established at Westwood, the old CDF Willow Creek and USFS Coppervale crews were eliminated and the CDF assumed operation of the Pegleg USFS lookout as a result of this change.

#### The 1970 Re-zoning Project

The Public Resources Code states that the Board of Forestry shall classify all lands within the State for the purpose of determining areas in which the financial responsibility for preventing and suppressing wildland fires is primarily that of the State. This "classification", often referred to as "Zoning", involves the application of Public Resources Code criteria to all land in California. These criteria are:

- (1) Lands covered wholly or in part by forest or by trees producing, or capable of producing forest products.
- (2) Lands covered wholly or in part by timber, brush, undergrowth, or grass, whether of commercial value or not, which protect the soil from excessive erosion, retard runoff of water, or accelerate water percolation, if such lands are



sources of water for irrigation, domestic, or industrial use.

- (3) Lands in areas which are principally used or useful for range or forage purposes which are **contiguous** to the lands described in subdivisions (1) and (2).

Lands owned or controlled by the Federal Government, or lands within the exterior boundaries of any cities are excluded from the classification of State Responsibility. Legislative intent is to include within State Responsibility areas, nearly all timbered, brush and wildland grazing areas which are not excluded as Federal land or incorporated city land.

During the past few years, various questions have been raised by the Legislative Analyst, the Department of Finance, and others, regarding State Responsibility areas. The Board of Forestry has several times reviewed on-the-ground, State Responsibility areas, the complexities of their delineation, and the fire protection problems on lands so classified.

As a result of these questions, and the availability of a State Forest Ranger on temporary assignment in the Fire Control Section for direction and coordination, it was decided in January of 1970 to undertake an in-depth study of State Responsibility areas. During the early part of this year, contacts were made in all the field districts, and with the headquarters staff, to assess the various problems and to develop instructional guidelines for this effort. In June instructions for this effort were developed and issued.

During the summer, as time permitted, the field work was accomplished by personnel of the Districts, Ranger Units, and Contract Counties.

In comparison with previous zoning efforts, which were delineated upon 1/2" to the mile maps, this project is being accomplished using United States Geological Survey topographic quadrangles which are uniformly available to Division of Forestry, Contract Counties and the U. S. Forest Service. These maps will then serve as the basis for future calculations of State Responsibility areas, and fire planning efforts.

The detailed information from the U.S.G.S. "Quads" has been transferred to 28 maps covering the entire state at a scale of 1:250,000 and are suitable for visual display of State Responsibility Areas.

At the years end the project is ready for presentations to and study by the Director of the Department of Conservation, followed by presentation for adoption by the State Board of Forestry.

#### Dispatching and Communications

To utilize the suppression organization as a flexible, mobile fire attack force, a statewide system of dispatching is maintained. This system includes local dispatching at Ranger Unit headquarters; Regional dispatching at five District headquarters; and statewide coordination of dispatching at the State Forester's Office.

To evaluate the dispatching system and to explore methods of improvement, a feasibility study for improvement or automation of the dispatch and control system was completed in 1970. The study was performed by the System Development Corporation of

Santa Monica.

The report recommended improvements in the Division's present dispatching system in the fields of standardization and improved manual control and record systems. The study team determined that an improved manual system would enable the Division to meet the projected dispatch workload until 1980. After that some form of automated dispatch and control system will be required to meet the increased workload.

During 1970 new radio equipment was installed to replace existing outmoded equipment, and to implement certain planned portions of the radio system.

*502 new mobile radios were installed. These radios are capable of operating on the State, District and Local radio nets. 486 were replacement and 16 were additional units.*

*45 new mobile relays were installed. 21 were replacement of old units and 24 were additional units required to implement new radio networks in 14 ranger units. These are for 12-volt DC operation and operate from a 12-VDC battery.*

*6 modern solid state communications center consoles were purchased and installed in 6 ranger unit dispatch offices. These consoles consist of 2 units installed side-by-side, each unit being independent of the other. This allows two dispatchers to operate side-by-side and should one console fail to operate for any reason, it would not affect the opposite console.*

*The existing two-frequency handie-talkie's were converted to operate on the new handie-talkie radio net. This was done to approximately 400 individual radios.*

Planning continued as necessary to make certain changes to the radio system as follows:

*Specifications were completed for new ranger unit headquarters base station radio equipment and 4 complete sets were ordered to be installed before the 1971 fire season.*

*The elimination of the Central Sierra District required considerable planning so that communications could be changed as required. At this writing, considerable detailed plans are in progress which must be completed by the 1971 fire season.*

#### The Air Attack Program

The combined CDF-USFS airtanker fleet remained at 35 aircraft during 1970. Twenty-one of these were contracted for by the Division with the remaining 14 contracted by the Forest Service.

Little pre-season activity was generated in California, however, Region 3 Forest Service and the Bureau of Indian Affairs in Arizona used all the aircraft that could be made available to them from California during late June because of abnormal lightning occurrence in Arizona and New Mexico. Other than a few flurries of flying in the south Sierra during late July,



activity remained normal through August and most of September except for a few airtankers dispatched to Region 6 on two separate occasions. Then, on September 22, a fire in the outskirts of Oakland along with several fires on the North Coast and the Mother Lode started a siege that was climaxed by a series of Southern California fires lasting until October 4. During the Southern California fires, airtankers flew approximately 1000 hours and dropped in excess of 1.4 million gallons of fire retardant, all without incident.

Because of the number of fires burning and the frequency of new starts during the Southern California disaster, a joint USFS-CDF aircraft coordination center was established at Ryan Field to handle all airtanker requests for the area from Porterville and Paso Robles south. A similar operation had been activated previously, but of smaller scope. To relieve dispatcher workload and speed up initial attack on new fires, in addition to handling the going fire needs, all airtanker requests from dispatchers and Fire G.H.Q.'s were placed directly to the "Center". Priorities were established by "Center" personnel with aircraft distributed to the going fires. Initial attack actions on new starts were requested directly from the "Center" to the closest available aircraft regardless of the jurisdiction they were working for at the time.

The season's airtanker operation was marred by four major airtanker accidents that were fatal to two pilots and one co-pilot. Late in the afternoon of July 18, a Super PBY crashed and burned at the south end of Columbia Airtanker Base killing both crewmen. On July 28, a T.B.M. crashed on take-off from Columbia and another T.B.M. crashed southeast of Bakersfield while working on a fire. There were no injuries in the Columbia accident, however the pilot suffered major injuries in the other. He has recovered completely and has returned to flying in Nevada. On September 4, a T.B.M. crashed while approaching a drop run in San Diego county, fatally injuring the pilot.

All of these accidents occurred to one operator, and as none appeared to have resulted from a mechanical problem, an overall review of his operation was precipitated with special emphasis on hiring practices, training, supervision and maintenance. Nothing specific was noted that might have contributed to the problem, although the review team felt a need for training exists with all operators. At a subsequent meeting with the California Air Tanker Association it was agreed to cooperatively develop and initiate a standard training program for each operator to follow.

Three inmates from a conservation camp crew were injured by an airtanker drop while working on a fire in the Modoc National Forest. A joint agency investigation indicated the accident resulted from a low drop of a large airtanker that occurred while the lead plane was absent from the fire to refuel. Fortunately, only one inmate was seriously injured with broken bones and bruises. Apparently the crew was not informed that a drop was going to be made in the area and failed to take defensive action in time to avoid being knocked to the ground and rolled. Each of the crews had been trained to avoid such an incident, however, it appears more warning is necessary under certain conditions. To accomplish this a study of warning devices will be renewed.

## Cooperative Fire Protection

The cooperative fire protection procedures and agreements between the wildland protection agencies in California once again proved their value during 1970. Many years experience in the protection problem that faces the fire forces in California each year has led to the present level of interagency cooperation.

For a number of years the counties of Kern, Los Angeles, Marin, Santa Barbara, and Ventura, have operated fire departments meeting the needs of wildland and life and property protection. In order to utilize and support this capability as an integrated part of the State's wildland fire control effort, agreements have been developed between each of those counties and the State Forester.

Through these agreements the counties receive monetary support from the State to provide basic protection on 4.25 million acres of "State Responsibility" forest, watershed, and range land. Over and above the "basic protection" level the counties and the CDF work cooperatively to suppress large fires in those counties. This system is effective and economical. It takes advantage of the capabilities of existing protection organizations without duplicating administrative and support functions.

Another cooperative protection program of the Division is providing fire protection services to local governments on a contract basis. Protection services provided to local jurisdictions are specified in each contract and the cost of the service is reimbursed to the State by the local jurisdiction. During 1970 contract fire protection was provided to local jurisdictions in 26 counties.

The services provided for in these contracts vary from complete protection services in large fire districts, to the employment of one man to supplement small volunteer fire departments. In all cases, however, the object of the local government contract program is the same - to provide fire protection to meet local problems and needs at the lowest cost to the taxpayer.

Cooperative agreements with Federal agencies have been an important part of the Division's protection program for many years. The U. S. Forest Service protects 5.2 million acres of private land within National Forests through a long-standing agreement, and adjustments in USFS-CDF protection boundaries are regularly made to make the best use of the suppression forces of both agencies.

During 1970, a new agreement between the Division and the National Park Service was signed. It modernizes previous agreements and specifies the protection to be provided by each agency in and around several National Parks in California.

A new agreement with the Bureau of Land Management was also developed during the year. This new agreement replaces four previous separate agreements and defines the protection arrangements for all "BLM" land in California.

Cooperation is the key word in all these agreements. The worst forest fire situation yet experienced in California occurred in 1970. No single agency could possibly have handled it alone, and the basic necessity for interagency cooperation was again forcefully demonstrated.



## Mutual Aid Assistance to Cities

During the current year, fifteen fire departments in California faced the possibility of firemen's strikes over labor relations conflicts. In most cases the differences were resolved through negotiations. But, in five cities officials requested CDF assistance in planning for manpower and equipment needs for what appeared to be inevitable walkouts. In all but one, however, last minute concessions by both sides prevented a walkout.

On Wednesday, October 7, firemen in Sacramento walked off their jobs, leaving 25 department personnel to man the equipment. The remaining personnel included 14 chief officers, and all miscellaneous members.

At the request of the Sacramento City Manager, Governor Reagan sent Division of Forestry personnel and equipment to augment the remaining department personnel. A total of 263 Division of Forestry personnel were involved in the operation, which lasted for 15 days. During the period, 384 alarms were received and answered.

## Water Project Fire Protection Planning

Planning efforts on two Type IV River Basin studies\*, the North Coast study, and the Central Lahontan Study on the east side of the Sierra Nevada continued. These studies are in cooperation with both federal and state agencies.

Installation of land treatment measures (fire protection, approximately \$254,000), on the Escondido Creek Project in San Diego County is continuing under Public Law 566. Negotiations are in progress to reach agreement with the sponsors which will form the basis for installation of land treatment measures (fire protection, approximately \$244,000) on the Upper Llagas Creek, Santa Clara County, Public Law 566 project. Fire protection measures (approximately \$181,400) included in the Main Street Canyon Public Law 566 project will be installed by the USFS on both federal and privately-owned land. Fire protection measures (approximately \$418,000) included in the Carpenteria Public Law 566 project will be installed by the USFS on both Federal and privately-owned land. CDF and the Santa Barbara County Fire Department will assist in a technical advisory capacity.

Fire protection needs on numerous reservoir projects were planned, in cooperation with federal, state, and local agencies participating in water development; Corps of Engineers, Bureau of Reclamation, U. S. Department of Agriculture, Federal Power Commission, State Department of Water Resources, State Water Quality Control Board, Flood Control Districts, municipal water districts, and special service districts. Participation involved review of Division of Forestry interest; preparation of fire plans, if needed; and recommendations to wildland managers, when applicable. To illustrate: the Corps of Engineers has advised they will endeavor to carry out the fire protection objectives recommended by CDF involving access, fuelbreaks, helispots, and other

presuppression needs, and fire precautionary measures needed during construction, recreational development, and operation of Corps projects. Division personnel also participated with the Corps of Engineers in a review of fire protection measures installed and maintained on the Isabella, Success, Terminus, Pine Flat and Black Butte Reservoir projects.

## Comprehensive Framework Studies

The Division continued to participate in the California Region Comprehensive Framework Study through a contract with the State Department of Water Resources. The output of this study will be a main report and 18 appendixes containing an outline of projected water and related land resource problems by year 2020 and the general approaches that appear appropriate for their solution.

The Division representative is a member of the Watershed Management, Minerals, and Land Resources technical subcommittee. Representatives from several federal and state agencies and departments serve on the subcommittee, and it is chaired by the federal Soil Conservation Service.

An "Advanced Preliminary Field Draft" of all the appendices was issued early in July. After review by the participating agencies and evaluation of their written comments, revisions were incorporated in the "Preliminary Field Draft". This edition was issued on December 1 for official agency review and comment. This last review, currently underway, will lead to further revision and then to preparation of the "Final Field Report" which is to be ready for distribution on May 1, 1971.

Considerable contribution, both in text form and in data resulting from special studies, was made by the Division to the Land Resources and Use Appendix. The major contribution by the Division to the Watershed Management Appendix was a description of the Region's watershed fire protection system, and the section on Climate, with specific emphasis on Watershed Management.

In September the chairman of the subcommittee appointed the Division representative chairman of the Watershed Management Task Force. This assignment carried responsibility for the revision, editing, and assembly of the "Preliminary Field Draft" edition of the report's Watershed Management Appendix. This task was accomplished by the first week of November and the printed appendix was released for review the first week of December.

Earlier population projections used in the study indicated the California Region could expect to contain about 55 million people by year 2020. New estimates, based on State Department of Finance data from the 1970 census and projected by the Framework Study Economics subcommittee, indicated the probability of a much lower figure of about 44 million people by the same year. Some updating of special studies and related data was done to provide an additional planning alterna-

\*Type IV River Basin studies are comprehensive plans developed under Section 6 of Public Law 566, for purposes of (1) flood prevention, or (2) conservation development, utilization and disposal of water, and thereby protecting the nation's land and water resources. The federal government cooperates with states and their political subdivisions, soil and water conservation districts, flood prevention and control districts, and other local public agencies in carrying out this program.



tive based on this smaller projection of population.

Review within the Department of the "Advance Preliminary Field Draft" was accomplished by the various Divisions during the months of July and August. Review comments were summarized and transmitted to the Chairman of the Framework Study Committee for forwarding to the Chairman of the various technical subcommittees.

### Mobile Equipment Management and Development

Equipment management and development is a vital support function for fire control and other Division activities. The main responsibilities of this function are:

Overall direction and technical supervision of the automotive maintenance program for the Division's fleet of about 2000 vehicles of many different types.

Supervision of the replacement and disposal of about 150 vehicles a year.

Development of new equipment design and specifications for equipment purchases.

Evaluation and testing of new equipment.

During the year, the first group of Model No. 8 firetrucks were delivered to the field for operational use. This model is a combination firetruck-tanker with a water carrying capacity of 1,250 gallons. It is designed for operation by a three-man crew and has conventional drive and a 500 G.P.M. pump. The Fire Plan calls for 33 of these units to be in operation at some future time.

The prototype of the Model No. 9 extended cab firetruck was placed into the field for testing during the year. This model, in which all personnel are seated under cover, is to become the standard conventional drive firetruck for the Division.

A major project started in 1970 was the fabrication and installation of roll bars on all Division firetrucks which have exposed rear seating for fire crew personnel. The project is scheduled for completion before the start of the 1971 fire season. Another safety-oriented project is to provide fire resistant protective "blankets" for each firetruck. These blankets are designed to protect firefighters from radiant heat and will be carried in specially built containers on the firetruck.

## • RESEARCH AND DEVELOPMENT •

Research and development have a significant role in the Division of Forestry program. Research provides fundamental knowledge necessary for understanding complex problems in forest protection, fire prevention, and wildland resource management. Development of equipment and techniques provides actual tools for attacking these problems. Their solution gives the Division additional means for carrying out protection responsibilities and meeting management needs due to rapid changes in wildland resource use and widespread awareness of relationships between wildlands and environmental quality.

Cooperative agreements or contracts between the Division and agencies or institutions engaged primarily in research are the principal means of meeting our research needs. A limited amount is in the category of administrative studies or field investigations.

### Fire Research

The Division continued its cooperative research program with several other governmental agencies and private individuals in 1970, although on a somewhat reduced basis. As part of the Division's budget reduction, funds were eliminated that have been contracted previously to the Pacific Southwest Forest and Range Experiment Station of the U. S. Forest Service for fuelbreak research, and to the University of California School of Forestry and Conservation for the study of economics of fire protection. Money continued to be contributed to the Experiment Station for research in fire meteorology and fire management systems. Also, although no money was involved, after July 1, the Division extended its agreement with the Experiment Station for cooperative efforts in fuelbreak research. In addition, Division personnel independently conducted several applied research studies and developed or evaluated several kinds of equipment designed to assist fire control personnel.

The Fuelbreak Project continued its search for chemicals to control regrowth of hard-to-kill species such as scrub oak without damaging other aspects of the wildland environment. Dry picloram pellets were found more effective than several other chemicals in controlling scrub oak, bear clover, brush, tree seedlings in a study designed to reduce the coniferous forest hazard. A 3-year study showed that herbicides moved through plants according to a complex interaction of soil, weather, and plant metabolism; and that the time of application of phenoxy-type herbicides must be geared not only to plant phenology but also to soil moisture and soil temperature.

A 3-year cooperative study, including the Division of Forestry, was started near the Lake Arrowhead Sanitation District Treatment Plant in the San Bernardino National Forest to study the effects of irrigation of chaparral with reclaimed sewage waste water; effects on many facets of the ecosystem will be studied by a broad spectrum of scientists.



The Fireclimate Project continued to seek ways of assisting fire control administrators to relate meteorological observations and forecasts to the solution of fire problems. Studies included the Santa Ana winds in southern California, the influx of marine air into the east end of the San Bernardino Valley and along the mountain slopes, and the fire behavior of major fires occurring in southern California. A valuable and major accomplishment was the printing and distribution of the *Fire Weather Handbook*, a long-awaited event. The Division of Forestry instituted continuous fire weather sampling and Ignition Index forecasting in all Districts except the North Coast.

The Fire Management Systems Project continued the development of a fire planning model that can be used by any wildland protection agency to analyze its fire problems and test alternative solutions to those problems on a cost effectiveness basis. In late 1970, the model was being applied to a national forest in the Southwest for further testing and refinement before broader application throughout the nation in 1971. In addition, project personnel continued development of a data-base system for fire planning, completed a first generation fire spread model for use with automatic data processing, and reported on rates of fire line construction by organized hand crews.

The Economics of Fire Protection Project, contracted to the University of California School of Forestry and Conservation, completed its mathematical model of managing air tanker operations in June 1970. The report describing the model and its use will be finished in early 1971.

The Division completed its evaluation of an electro luminescent Band-O-Lite belt and found that bulldozer swamper wearing the belt were much more easily located by bulldozer operators during night operations. A statewide evaluation showed that telecopiers had several advantages when compared to teletype systems. The Division continued its evaluation of wetting agents during the 1970 fire season, and a report was to be completed during early 1971.

## Fire Prevention Research

Objectives of fire prevention research are to determine knowledge, attitudes, and behavioral patterns of people as related to the prevention of forest fires; to determine how these characteristics can be changed favorably and most effectively; and to identify characteristics of fire setters.

During 1970 fire prevention research provided the Division with more information regarding the attitude and behavior of people. The final research report on the Headstart fire prevention and conservation education research project involving 1500 pre-school children in Riverside County was completed by the Pacific Southwest Forest and Range Experiment Station. This report enabled the Division to start final revisions for the preparation of an early elementary teachers packet directed toward the reduction of child-caused fires.

Research continued at Chico State College using a television version of the conservation education material presented in 1969 by individual teachers in the classroom. The TV version was presented to representative kindergarten and first grade classes within the range of the Redding educational TV channel. Analysis of the data has been completed. First grade students did very well, but the program was not as effective with kindergarten children. Expanded use of this program is under consideration.

An evaluation of TV spots indicated that the popular notion of scaring the public will stimulate attitude change was tested in TV spot experiments. A threat film, a no-threat film, and a mild-threat film were used in the experiment. No significant attitude changes were detected on the part of junior college students who viewed the films. However, more subjects viewing the "no threat" and "threat" films experienced an increase in anxiety than did those viewing the "mild threat" film and control films. The mild threat film was more effective with those who recently lived or worked in the wildlands.

A condensed version of an original study of CDF personnel attitudes toward the fire prevention program by Dr. Sarapata of the UC Research Survey Center was completed and distributed to the Field.

A re-survey of the attitudes and knowledge of Butte County residents toward fire prevention was completed. Analysis was made of the coverage of fire and fire prevention information by the newspapers serving Butte County during the study period and the period immediately preceding it. An official research note will be available during 1971.

Research will continue with the Gulf Atomic Company to develop a system whereby the use of trace elements can be identified in fire starting materials and subsequently tied to individuals who start fires. This is commonly called coded tagging.

An ignition study was initiated with the USFS Fire Laboratory in Riverside which will provide information of the burning characteristics, heat retention, and fire starting probabilities of fire causing devices. These devices will be tested under a variety of environmental conditions.

## Soil and Vegetation Survey

The State Soil Vegetation Survey is being carried out cooperatively with the Pacific Southwest Forest and Range Experiment Station and the University of California.

During 1970 fiscal year, field teams mapped 158,000 acres; this acreage includes continuing work in Butte, Calaveras, and Tuolumne counties. Laboratory scientists analyzed 168 horizons from 39 soil profiles. Rangeland fertility trials were continued in the mapping units.

Total area surveyed to date is as follows:



County	Acres	
	Completed	In Progress
Mendocino	2,034,000	-
Lake	499,000	-
Humboldt	1,903,000	-
Tehama	1,113,000	-
Glenn	200,000	-
Shasta	1,272,500	-
Trinity	238,000	-
Sonoma	554,000	-
Del Norte	132,000	-
Yuba	76,000	-
Tulare	9,500	-
Butte	441,000	181,000
Plumas (SW)	39,000	12,000
Calaveras	499,000	93,000
Tuolumne	93,500	216,000
	<b>9,103,500</b>	<b>502,000</b>

#### Other Research

Due to curtailment of the budget, four contracts with the University regarding planting stock, physiology, rodent control, bark beetles, and dwarfmistletoe were discontinued on June 30. Assistance to the University on research at the Blodgett Forest in El Dorado County from the Growlersburg Conservation Camp and at Whitaker Forest in Tulare County from the Miramonte Conservation Camp continued. Similarly, inmates from the Prado Conservation Camp were again used at the San Dimas Experimental Forest of the Forest Service in Los Angeles County.

## FOREST, RANGE, & WATERSHED • MANAGEMENT •

The forest, range, and watershed management activity was developed to assist and encourage management and improvement of the resources of California's vast extent of wildlands. The activity includes assistance and encouragement to landowners, regulation of timber harvesting on private lands, and demonstrations of good wildland management practices in maintaining their productivity and enhancing the quality of the environment. Administrative studies and practical field tests and investigations provide additional knowledge for attaining established objectives.

#### State Forests

The State Board of Forestry in 1970 adopted rules regarding geothermal operations on State Forests. The purposes of the rules are for the regulating of prospecting and drilling for and the operation of geothermal resources on State Forests to insure that geothermal operations will be compatible with other State Forest uses with due regard to the protection of life, property, quality of the environment and natural resources.

Legislation was introduced and passed in 1970 to

allow for the Mendocino Woodlands Recreation Area on Jackson State Forest to be leased for a period not to exceed 30 years. The purpose of the legislation is to assure lessee sufficient time to use present facilities and make substantial capital improvements that will be required in the near future. Negotiations were started in 1970 to develop a satisfactory long-term lease agreement.

The 250-acre Pygmy Forest Reserve on Jackson State Forest has been designated a Registered Natural Landmark under provisions of the Historic Sites Act of August 21, 1935. This Natural Landmark possesses exceptional value in illustrating a unique botanical feature of the natural history of the United States. It is a rare area of podsol soils, having high acidity and low fertility, on which only certain shrubs and dwarfed trees grow. This association of soils and plants has worldwide interest to soil technologists, botanists, ecologists, and nature lovers. A bronze plaque and certificate have been received from the U. S. Department of Interior, National Park Service declaring the Pygmy Forest Reserve a registered natural landmark.



L. A. Moran, watching Lt. Governor Ed Reinecke receive the Pygmy Forest natural landmark plaque from Mr. Ted Owings, Assistant Regional Director of the National Park Service.

Because of interest shown by the University of California and many others in the Pygmy Forest Reserve and its transitional zones into surrounding commercial forest stands, a cooperative agreement was entered into with the University to reserve an additional 60 acres adjacent to the Reserve. In addition to investigation by University botany, forestry and soil scientists, the "Pygmy Forest - Redwood Study Area" will be used for study by citizen groups, schools and the public. A portion of the Study Area was previously included in a major timber sale. However, with complete cooperation from the timber sale purchaser and by amending the timber sale agreement a portion of the sale area was reserved for the study area, thereby providing a complete transition zone from the Pygmy Forest to and across a major stream in the normal redwood forest.

A heliport was built on Boggs Mountain State Forest during 1970 by the Lake County Ranger Unit. The new facility includes two concrete helicopter landing pads;



water, sewage, electric, and LPG systems, an office, kitchen, storage and residence trailers to house the Northern California Helitack Crew. This facility will provide increased fire protection to the Forest and surrounding areas.

Intense warm storms in January 1970 melted a normal snow pack on Latour State Forest and the resulting flood caused extensive damage to roads and drainage systems. In some places the roads simply disappeared or were covered over by slides. Culverts that had been adequate to handle storms for the past 18 years were inundated and failed to handle the flows. Road surfaces were eroded, fills washed away with culverts, and in one place a mud slide two-thirds of a mile in length and 100 feet wide occurred, wiping out all vegetation and the road in its path. Temporary road repair work started in March but not until June was the road passable to light vehicular traffic to the forest headquarters. Because of road conditions being so disrupted, plans for the major timber sale were revised to a two year sale so that sufficient time would be available to accomplish the necessary bridge and culvert repairs for access to the sale area.

Two new weighing stations were installed and used on Jackson State Forest. For the first time all major timber sales from Jackson State Forest were sold using the board foot to weight ratio with satisfactory results. State Forest Note No. 42 which deals with the Division's experiences with the board foot to weight ratio on Jackson State Forest was published in August of 1970. This concept of selling and buying logs is being accepted by the forest industry in Mendocino County. One saw-mill installed a weighing station in its mill yard and that mill expects to buy most, if not all, of its logs in the future using techniques developed on Jackson State Forest.

Timber inventory activity was high in 1970 on Mountain Home, Latour and Jackson State Forests. Mt. Home State Forest established a 117 permanent variable plot inventory system which is very similar to Latour's system. The first remeasurement of Latour's inventory was completed during 1970. The second remeasurement of Jackson's inventory was completed in 1969 and was sent to the University of California under agreement in 1970 for data processing. Processing of Mountain Home and Latour inventory data was also arranged in 1970.

White Pine Blister Rust control work continued on Mountain Home State Forest in connection with other timber stand improvement work. About 790 acres were treated. All sugar pine in infection centers that were of no potential value as crop trees or had cankers on or near the bole were removed. Other sugar pine trees with cankers only in the branches and those without cankers were pruned leaving at least one-third of the crown, or 18 feet, to lessen their exposure to infection.

Timber harvesting activities were not as high as in 1969 because of market conditions and flood problems at Latour. Still, over 34 million board feet of timber were cut, 6,545 Christmas trees and other miscellaneous products were sold during 1970. The revenue received for these renewable resources was \$1,266,269. The one sale on Boggs Mountain State Forest received no bids due to poor market conditions and will be offered again in 1971.

In-lieu taxes paid by the State to the counties for State Forest properties increased 20.5 percent in the

1969-70 tax year. The \$88,434 paid during 1969-70 brings land and timber taxes paid since the forests were acquired to a total of \$777,550.

Besides being used for demonstrational and experimental work, and the timber and water they produce, State Forests are valuable for food and shelter they furnish fish and wildlife. Hunting and fishing are major attractions. In 1970, recreational use amounted to some 64,600 visitor-days, and over 43,100 camper-days. The 70,398 acres of State Forests land provide the public a dynamic forest environment for a wide variety of outdoor activities and experiences.

### Forest Practice Act

Substantial progress was made in 1970 in Forest Practice Act administration in refining provisions for corrective action in conjunction with timber operator permit denials. A preliminary injunction and temporary restraining order for rule violations was issued by a court for the first time, resulting in the operator correcting the violations promptly.

In 1970 much pressure and activity for tighter regulation and more local control of logging developed, particularly in the San Francisco Bay Area counties and in the Lake Tahoe Basin. Accelerated logging in young growth timber in urban areas near San Francisco Bay during a period of high demand for export logs caused considerable local pressure that culminated in revision of the Forest Practice Rules for the Redwood Forest District to cope with this situation. Other legislation was also enacted.

In January the Board of Forestry requested the Redwood Forest Practice Committee to review the logging situation involving local logging regulations in the Counties of Marin, San Mateo, and Santa Cruz, and to advise the Board of its findings. The Committee held a public hearing in Redwood City on February 9 and 10 to consider requests of citizens and officials in the Bay Area counties for special rules for timber operations there. In late February the Committee reported to the Board, recommending that such rules be developed. The Board ordered the Committee to develop proposed rules.

In the meantime the Forest Practice Act was amended by special emergency legislation, giving the Board of Forestry the power to adopt temporary Forest Practice Rules on its own motion upon finding of an emergency. The Committee conducted hearings and presented its recommended amendments that the Board adopted on April 15 as temporary rules. In June the Board held a field trip in San Mateo and Santa Cruz counties in connection with the scheduled hearing in Redwood City where it approved the amendment of the Forest Practice Rules on a permanent basis.

A major feature was the creation of a Southern Area of the Redwood Forest District with more intensive requirements for leave trees, stocking, erosion control, and hazard reduction because of silvicultural and climatic differences, and more intensive land use near dense population centers within the Redwood Forest District in the Counties of Monterey, Santa Cruz, Santa Clara, San Mateo, San Francisco, and Marin.

Even with the new Redwood Rule amendments, continued local pressure resulted in further amendment



of the Forest Practice Act by the legislature, allowing the counties of Marin, San Mateo, and Santa Clara to adopt ordinances or resolutions for stricter regulation of logging than provided by the Act and District Forest Practice Rules. The November 1970 issue of the Journal of Forestry contained an article "State vs. Local Forest Practice Regulation in California", by Deputy State Forester T. F. Arvola, that discusses the critical Forestry issue in California as to whether private forest practices should be regulated exclusively by the State, or whether timber operations should also be controlled by agencies of local government.

In February the Board of Forestry also requested the South Sierra Pine Forest Practice Committee to review rules in its District to see if special rules were needed for the Lake Tahoe Basin. The Tahoe Regional Planning Agency appointed a Logging Standards Committee to study and recommend special rules for the Basin to the South Sierra Pine Forest Practice Committee.

Governor Reagan appointed Leonard Lindberg to the Coast Range Pine and Fir Committee to replace David Williams who resigned, and Norman L. Richardson to the Redwood Forest Practice Committee to replace Harold Prior who resigned. Lem Hastings resigned from the North Sierra Pine Forest Practice Committee. Deputy State Forester Fred M. Dunow, Secretary and Board of Forestry representative on the South Sierra Pine Forest Practice Committee resigned upon retirement and was temporarily replaced by Assistant Deputy State Forester George Phibbs until he was replaced by Deputy State Forester Don Knowlton in late December. The State Legislature amended the Forest Practice Act to add two public members to each of the four Forest Practice Committees.

The State Forester issued 219 new timber operator permits in 1970 and renewed 948 permits, collecting \$13,760.00 in license fees. There were 163 fewer timber operators in 1970 than in 1969. Some 1,167 operators reported cutting 5.00 billion board feet in 1969 — about 0.34 billion board feet less than in 1968. In 1969, 874 operators cut primarily saw and veneer logs and 456 others cut miscellaneous forest products, including pulp logs, split products, fuelwood, christmas trees, and greenery.

In 1970 the Division made 2,026 forest practice inspections statewide and found that 94% of all rules inspected for were in compliance compared with 93% in 1969. Overall compliance with rules was: Redwood District 98%, North Sierra Pine District 94%, South Sierra Pine District 96%, and Coast Range Pine and Fir District 92%. Inspectors observed 860 violations of rules while 1,012 were observed in 1969. Rules most often found in violation were snag disposal, erosion control, fire plan filing, slash disposal, fire rule posting, and keeping protection roads open, in that order. Snag disposal has been the leading violation, and erosion control and fire rule posting have been among the top three violations for a number of years now. As in previous years, the Division carried out most law enforcement administratively, sending out 758 notices for violation of forest practice rules. Also, as in past years, Division personnel sent many letters and held follow-up meetings with timber operators and owners to improve compliance with the rules. Fourteen Forest Practice cases were concluded and 24

more were in various stages of corrective action or legal development making a total of 38 cases acted on during 1970.

The timberland conversion regulations as revised in 1968 continue to be reasonably effective in restricting applications to timberland owners having a bona fide intent to convert timberlands to other than timber growing uses, and in holding the acreage to that required. The State Forester issued 33 conversion certificates for devoting 20,568 acres to a non-timber growing use, compared with 53 certificates for 16,197 acres in 1969.

The Board of Forestry amended five alternate plans and approved 30 new plans, and one plan terminated in 1970.



Looking over logging operations, Board of Forestry tour of Southern Area, Redwood Forest District.

### Forest Pest Control

Protection of California timberlands from forest pests (insects, animals, and disease) required an intensive cooperative effort by the Division, private landowners, and Federal Government. To meet this responsibility the Division had an active part in the detection, appraisal, and control of forest pest damage.

Forest insect losses again continue at low levels in 1970. However, in Southern California below normal precipitation caused bark beetle activity to increase. Smog, root diseases and fires were contributing factors to insect losses.

Members of the Insect, Disease, and Southern California Committees of the California Forest Pest Control Action Council toured the smog evaluation facility at Lake Arrowhead. Research is being conducted to show the effect of smog on pine trees in Southern California. In one greenhouse local unfiltered air is circulated over pine trees, and in another greenhouse the air is filtered and then circulated over the pines. Results showed that the trees growing in filtered air overcame the effects of smog and grew normally. Those in the unfiltered chamber continued to decline.





Testing trees in greenhouse for smog damage in San Bernardino mountains.

Cooperative surveys with the U. S. Forest Service, University of California and forest landowners have shown an increase in the Douglas-fir tussock moth. This insect has become active in Shasta, El Dorado, Tuolumne and Mariposa Counties. The first field test in California of a natural virus to control the moth may be tried in El Dorado County in 1971. Other surveys have shown that insects can damage the highly proclaimed resistant redwoods of the north coast.

At Lake Tahoe the pine needle scale insect population is decreasing on lodgepole pines, but high numbers still remain on Jeffrey pines. Mountain pine beetles are causing group killing of scale weakened lodgepole pines.

There is little change in the overall forest disease condition existing in the State. Elytroderma needle disease was reported more frequently. Red band needle blight is still prevalent on the north coast. Surveys in the southern Sierra reveal only five areas containing white pine blister rust. Three new nursery disorders were detected in the U. S. Forest Service nursery in Humboldt County. Continuing smog damage surveys indicate increasing damage to conifers in Southern California.

Deer browsing again leads as the most serious animal damage problem. Browsing is increasing at a rapid rate in the northeast and central forests, and is a major problem in forest regeneration.

Seven bark beetle control projects were conducted during the year with 4,190 trees being treated. a special blister rust control project on Mountain Home State Forest, Tulare County, involved 790 acres where 1,198 trees were pruned and 3,258 infected sugar pines were cut down to prevent the spread of the disease.

#### Forest Advisory Services

California's 30,000 owners of small forest properties hold 3½ million acres of timberland. The needs of the State are so great that this land should be managed and protected for forest production without harming the environment. Such landowners usually do not possess the professional skills needed to manage these lands for their full capability. Advice is also needed to comply with forest laws, prevent erosion, protect aesthetic values, and provide suitable recreation, and wildlife habitat and the

best environment feasible.

There are ten Forest Advisors located strategically throughout the State to meet with landowners and confer on the ground about forest protection, reforestation, harvesting and marketing of forest products, recreational development of properties, and many other land management activities.

The slump in timber stumpage prices that started in mid 1969, continued through 1970. The total value of forest products with Forest Advisor assistance dropped to \$1,590,920 from \$3,334,000 in 1969. During 1970 3,193 requests were received for help from owners throughout the State. Assistance was given to 2,305 landowners on 261,693 acres of timberland. Harvesting of forest products took place on 4,166 acres. Timber stand improvement work was accomplished on 2,498 acres and 9,950 acres were planted or seeded to trees. There were 329 referrals to consulting or industrial foresters because of the complexity of the problems and the type and amount of assistance needed. There was also increased interest shown in forest fertilization as a means of increasing forest production.

The continuing smog damage to forest trees has increased the involvement of foresters in urban areas. Much advice was requested about damage to trees, recreation developments, and logging of forest land near urban areas. Summer home developments and fragmentation of large wildland tracts into small parcels has increased the workload of forest advisors. This activity had been increasing for the past several years. There is a need for better land-use planning to minimize detrimental effects and to provide basic forest resources for public benefit. Under the Agricultural Conservation Program, Forestry practices rely on Forest Advisors for technical advice and guidance for successful implementation. These practices include planting, seeding, and thinning of forest stands to increase timber production.

The Division is a technical advisor for the Resource Conservation Development Project in Modoc County. Progress is being made to develop markets for the use of juniper for lumber, pencil stock, and posts. Juniper lumber has been shipped to Japan for possible use in the Japanese markets. Effort is now being made to develop a market for barbecue chips from mountain mahogany. The market for wood chips from Modoc County sawmills is also being studied. The results of the production of California's forest industries was completed in 1969 and published in 1970.



Juniper log being sawn at Calandor Pine mill in Modoc County.



The Division is now a consultant to the Lake Tahoe Regional Planning Agency and other governmental entities within the Lake Tahoe Basin to encourage good forest management concepts on private lands. These concepts are to be incorporated into the planning and development of the Tahoe Basin. The Division will also provide liaison with existing and proposed research efforts having a bearing on the Tahoe Basin's forestry and ecological problems and bring research results to the attention of the agencies within the Tahoe Basin.

### Nurseries and Reforestation

The amount of reforestation work in California continued to climb upward, setting records since the first reforestation of the early 1900's. Most of the increase as in the last few years, was the result of seeding recently logged areas. On private land, 16,900 acres were seeded in the 1969-70 season. On public lands other than federal, and on private land, 6,075 acres were planted to seedlings.

The Reforestation Advisory Committee, consisting of eight men, is appointed by the State Forester. Members represent the various geographical areas and forestry interests in the State. The Committee met in May in Amador and Calaveras Counties to revisit some of the reforestation projects and studies visited five years before. At an indoor meeting in Martel, the Committee expressed concern about the possibilities of 2, 4, 5-T being banned for use in brush control work. This chemical is a useful tool in establishing young forests. Members also reviewed and approved a new State seed zone map designed to facilitate cone collection source information.

In late October, the Committee met at Mt. Shasta, Siskiyou County, and toured brush control projects conducted by the U. S. Forest Service in that area. Methods used by the Forest Service to replace unwanted brush with pine trees has been very successful. Among subjects discussed at the Committee's indoor meeting in Mt. Shasta was the general increased interest in reforestation. Indications are that within the next few years the state's tree nursery capacity will be over taxed and some alternatives to meet the demand must be explored. There is also an increased interest among landowners in improving forest trees genetically; ways of accomplishing this were discussed.

As the result of a Reforestation Advisory Committee recommendation made to the State Forester in 1969, the University of California Extension Service conducted a three day short course on reforestation and forest genetics for private and government foresters. This was held at the University of California School of Forestry and Conservation in Berkeley in March.

The State Forester's Reforestation Advisory Committee maintains a keen interest in the Division's reforestation studies. Here in Amador County, members are observing results of combinations of burning and herbicide spraying to control a dense ground cover of mountain misery. This pest has excluded all ponderosa pine regeneration.

A number of studies pertaining to reforestation were conducted by the Division. At Davis Headquarters Nursery, a laboratory study was run to determine the best time to lift Sierra redwood seedlings from nursery seed beds. New roots on seedlings grown for 30 days in soil-filled trays placed in a temperature controlled water-bat<sup>4</sup> determined the physiological condition of the seedlings. Of monthly lifting dates from January to April, the mid April one produced the most new roots, indicating that this was the best time to lift Sierra redwood seedlings.

On American Forest Products Corporation land in Amador County rodents were controlled by baiting, and seed traps were set out on slopes that had been terraced by company bulldozer. The purpose of the study was to determine the effectiveness of natural seed fall on a well prepared seed bed. Combinations of burning and spraying mountain misery, a dense, low growing ground cover in Amador County, was also tried. Two, 2, 4, 5-T formulations appeared to be more effective than other chemicals in controlling this pest. An artificial seeding study was continued at Blue Canyon Tree Farm in Placer County. Mortality counts were made of Douglas-fir, white fir and ponderosa pine seedlings produced from fall, 1969 seeding. A seed bed scalped six inches into the top soil and shading new seedlings appeared to provide the greatest number of seedlings at the end of the growing season.

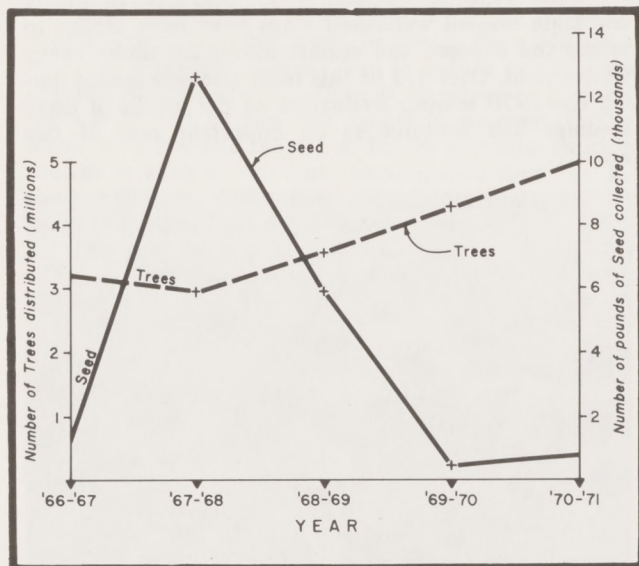
Studies in genetic tree improvement included artificial pollination of ponderosa pine at the U. S. Forest Service, Badger Hill Tree Breeding Orchard in El Dorado County. Pollens from selected trees in Calaveras County were applied to selected trees at Badger Hill. Cones produced from earlier artificial pollination in Nevada County were collected, and the extracted seed will be sown in the nurseries next spring. Artificial pollination of knob-cone pine with Monterey pine pollen to produce a hybrid of the two species was continued at Davis Nursery Tree Breeding Orchard. This drought resistant hybrid promises to be a rapid wood producer, and it has possibilities for fast growing Christmas trees. Seedlings of the hybrid, developed from earlier pollination, were distributed to several cooperators throughout the state. Survival counts were taken and height measurements made of progeny from earlier within-species ponderosa pine crosses and Jeffrey X Coulter pine hybrids.

The demand for nursery stock in 1969-70 was greater than the Division's three nurseries could produce.





In addition to the 3,756,000 seedlings distributed from Division nurseries, 535,000 trees were purchased and distributed from U. S. Forest Service nurseries. The total was 4,291,000 seedlings. This is a record in the history of the Division's nursery program. Of this total, 365,000 were planted on public land and the remainder on private land. Forest industries planted 646,000 trees for reforestation. The total value of the trees was more than \$153,000.



Seed collection and tree distribution in the Division of Forestry reforestation and nursery program.

The demand for nursery stock, as can be seen, is increasing, but the forest trees are not doing their part to produce sufficient cones for seed; at least not in the last two years. The nurseries require nearly 3,000 pounds of seed annually, and in the last two years only 420 pounds and 720 pounds, respectively, have been produced. Fortunately, a large quantity of seed has been stored at Davis Headquarters Nursery. If poor crops persist, however, the planned production of nursery seedlings may have to be reduced drastically. This emphasizes the need for all-out collection efforts when crops are good.

#### Brush Range Improvement Activity

The brush range improvement program has as its objectives, improving forage production on brush-covered lands, fire prevention and protection, and watershed protection and conservation. The Division provides advisory services to applicants for controlled burning permits as to precautions to be taken to prevent damage to adjacent property owners due to such burning, and to provide standby fire protection to the extent regular fire crew personnel and equipment are available.

One hundred eighty-three applications were received proposing to burn 82,492 acres of brush range land for livestock and wildlife habitat improvement; 163 permits were used for burning. These permittees conducted 118 controlled burns; 16 were cooperative projects including

participation of two or more landowners. Regular Division fire control forces were available for standby in the event a fire escaped during the burning of 24,020 acres on 25 separate projects during 1970.

Activity in controlled burning dropped again continuing the downward trend in acres burned. However, the number of separate burns remained about the same as that in 1969, but with a decrease of about 21 percent in total area burned. The greatest reduction in acreage was in the North Coast District and more specifically in Mendocino County. Field units report that several proposed burns were deferred due to unfavorable weather and publicity regarding the serious fire situation in Southern California during the critical period of September and October and counts for much of the reduced activity.

Since 1945, about 2.5 million acres of low quality forage lands have been control burned. This acreage includes 0.7 million acres returned to maintain a suitable range forage cover. To a much greater extent, the use of fire is becoming more of just one phase rather than the total remedy in the process of converting unproductive brush-covered land to productive rangeland.

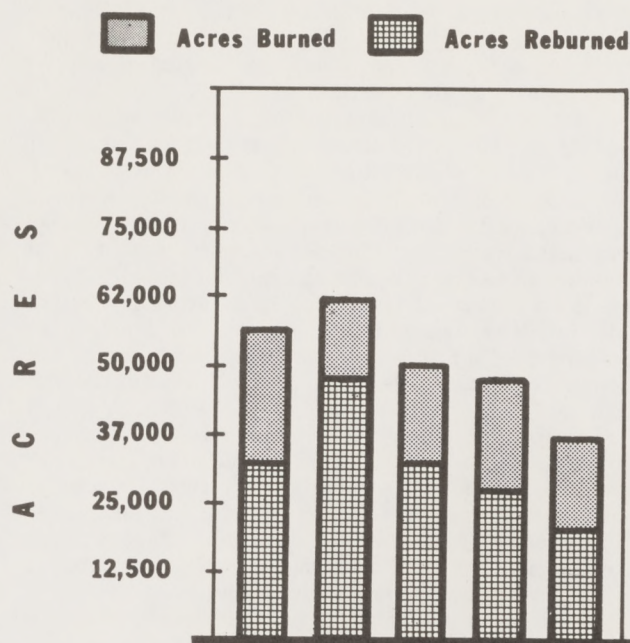
Division range specialists provided assistance to private landowners through individual and group contacts regarding other land treatment practices prior to and after, or combined with burning. Recommended range improvement measures include: mechanical preparation, followup seeding, and chemical sprout control used in combination with fire for land clearing. These range specialists assist over 400 ranchers and sportsmen annually, helping them to solve controlled burning, and other problems of brush range improvement.

The Division's cooperative range improvement field study program is conducted for the purpose of testing methods and demonstrating practices. Findings from these studies are published from time to time in a series of Division publications entitled **Range Improvement Studies**. Two such Range Studies were released this year covering "Ball and Chain Brush Crushing" to prepare fuel for controlled burning, and "The Brush Disc - An Effective Tool for Brushland Range Improvement," as an effective method of brush removal on the more productive lands to increase forage. The range improvement field studies are authorized under sections 4771-4776 and 4781-4788, Public Resources Code, and are available for public distribution.



Crushing 15 to 20 foot high mixed chaparral with the "Ball and Chain" prepared fuel for an excellent burning job on the Jef Schmidt Ranch, San Benito County.





Control-burned acreage dipped again in 1970. More than 51 percent of the total area treated was reburned to maintain a good cover.

#### Emergency Revegetation

Tragic forest and brush fires plagued California during much of the 1970 fire season, burning over 595,724 acres of primary watershed lands in 37 separate fires. Vast areas within these burns were left barren and subject to severe soil erosion and flood damage, a frequent aftermath of large fires.

In an attempt to reduce the chances of excessive damage, the Division of Forestry conducted the most extensive seeding project in its history. The fires were not yet out when Division personnel were dispatched into the critical fire areas to begin making plans for seeding. The watershed and range specialists from all districts were called upon, as they were in 1967, to move into southern California to help with the important task of mapping burned areas needing emergency revegetation. Through their findings, it was determined that 127,269 acres of private land and 97,480 acres of intermingled public lands were in need of seed to establish a temporary cover to protect the soil from excessive soil erosion (table 1).

These same people, plus many others, were once more called upon to help direct and supervise this massive seeding program which included 20 fires in 9 separate projects. Included in the total of 224,749 acres seeded was the largest aerial seeding project ever undertaken—160,000 acres of the giant Laguna burn in San Diego County (fig. 1). The task was clear, the work plan was to get the ryegrass seed sown on the areas before the fall rains. Without delay, 1.75 million pounds of ryegrass seed was requisitioned and aerial seeding contracts were let. Aircraft started seeding at dawn on October 24 and continued through November 9th. Both fixed-wing aircraft and helicopters were used, a total of 15 ships, as many as 9 at one time on the big Laguna project. One late season fire, the Reche Canyon burn of 3,580 acres in mid-November, was seeded after the big show.

In addition to the Division's seeding activities, there were seedings by the Los Angeles County Fire Department, the U. S. Forest Service, the Bureau of Land Management, and the U. S. Army. These agencies seeded a combined area of 194,135 acres of watershed denuded by 16 major fires that burned during the critical fire period of late September through mid-November. 91,345 acres of privately owned land were included in this total (table 1).

Since 1956, approximately 555,886 acres of private and state burned watershed lands have been seeded to secure the exposed soil against movement under heavy winter rains. Over 1/3 of this total area was seeded during the 1970 season. Evaluation of the results of these seedings will continue as an important part of this activity.



Fig. 1. The large Laguna fire started on Sept. 26 and burned 175,425 acres of primary watershed land in San Diego County before being controlled on October 3, 1970.

TABLE 1.  
EMERGENCY REVEGETATION - 1970  
CDF PROJECTS

Project Name	No.	Total Acres Burned	Land Seeded (Acres)		
			Private	Public	Total
Laguna	(1)	175,425	81,322	78,314	159,636
Lilac	(1)	1,863	1,753	-	1,753
Los Encinitos	(2)	1,437	1,136	-	1,136
San Timoteo	(8)	8,076	7,332	-	7,332
Meyers	(1)	34,869	17,490	16,856	34,346
Clampitt	(1)	76,794	5,576	-	5,576
Foothill	(1)	5,545	5,545	-	5,545
Reche Canyon	(1)	4,256	3,580	-	3,580
Trabuco	(2)	3,505	2,025	-	2,025
Boudry	(1)	1,361	120	860	980
Corona	(1)	520	340	180	520
Parkhill	(1)	2,360	1,050	1,270	2,320
	(21)	316,011	127,269	97,480	224,749
Other agencies*		179,713	91,345	102,790	194,135
Grand Total		595,724	218,614	200,270	418,884

(No. ) = Number of fires each project.

\* 16 seeding projects conducted by federal and local agencies.



## • FIRE PREVENTION •

The objective of the Fire Prevention Element is to hold the occurrence of man-caused fires on State Responsibility Lands at approximately the current level (1965-69 average), contributing to the attainment of the Fire Protection objective by means of activities which have been demonstrated to be effective in preventing the ignition and initial spread of uncontrolled man-caused fires.

More specifically, the objective is to influence people — those who live, work, or play in the wildlands — to act in a fire-safe manner, and to reduce or eliminate physical hazards or risks. There is no intent to prohibit the use of fire or fire risk agents or equipment. The intent is to regulate the use of fire or potential ignition sources in such a way that "uncontrolled fires," as defined in Section 4104, Public Resources Code, do not occur in excess of the above stated objective.

The goal for the 1971-72 period (fire season '71) will be to hold the occurrence of man-caused wildfires to or below a total of 6,221 (1965-69 annual average).

### Fire Prevention Activities

The workload table shows the inventoried fire prevention work needing to be done and that which is completed in State Protection Responsibility Areas.

Although only about 1/3 of the public roadsides receive hazard reduction treatment, the railroads and power companies are now treating about 3/4 of their rights-of-way. One-fourth of facilities and areas are receiving inspection treatment by Division personnel. Many of these should receive more than one inspection.

Workload Inventory and Accomplishments in Fire Prevention: 1970

ITEM	NUMBER (Miles)	TREATED (Miles)
Roadsides	28,703	9,049
Railroads	1,409	876
Power lines	25,309	13,531
	Number	Inspections
Dumps	1,036	1,201
Structures and Premises	328,588	52,645
Recreational Areas	4,829	1,653
Forest Products, Mills and Operations	2,022	573
Industrial and Agricultural Operations	4,058	926
Mechanical Equipment (Inc. Trail Bikes)	152,002	10,941
Burning Permits Issued	60,547	16,261
Project Permits Issued	906	906
	Number	Articles Programs
Press, TV, Radio, Theater	1,082	33,467
Schools	3,030	3,263
Clubs, Groups, Associations	9,578	2,546
Commercial	2,240	63
Exhibits-Outlets (Fairs, Parades)	405	947
Recreational Areas (organized)	1,144	240
Fire Prevention Material Distributed	Number	
California Division of Forestry	2,982,464	
Cooperators	4,619,462	
Fire Prevention Public Contacts	775,541	
Movie trailer and TV spots distributed	840	
Fire Prevention Committee members	512	
Enforcement Cases		
Misdemeanors (prosecutions completed)	341	
Felony (prosecution completed)	26	
Fire Cause Investigations	8,104	
Civil Cost Collection Cases (closed)	274	
Research Projects	8	
Employees given training	224	

### Fire Statistics

The below table shows the wildfire incidence experienced by the Division of Forestry on all direct protection areas during 1969 & 1970. Included is the 5-year average (1965-69). It further shows the incidence by causes, and by the most common causal agent and location.

The second table shows the wildland fire incidence and acreage burned on lands protected by all forest fire protection agencies in California during 1970.

WILDFIRE INCIDENCE (CDF DIRECT PROTECTION)

	1970	1969	5-Year Average
State Responsibility (Zones 1 & 2)			
Forest-type fires	5,216	4,414	3,978
Confined Fires	3,107	2,902	2,625
County Responsibility (Zone 3)			
All Fires (vegetation & confined)	9,446	10,004	9,361
Total CDF	17,769	17,320	15,964
Major Causes (Forest-type Fire, Zones 1 & 2)			
Lightning	219	595	371
Campfire	215	140	99
Smoking	733	530	582
Debris Burning	405	352	385
Incendiary	1,168	837	746
Machine Use (including railroad, construction, logging)	793	716	677
Miscellaneous (incl. child, power line)	1,683	1,244	1,111
Causal Agents and Locations (Forest-type Fire, Zones 1 & 2)			
Occupant	755	578	617
Recreationist or Traveler	1,393	868	869
Timber Operation	22	18	21
Hunter	103	104	122
Railroad	253	248	254
Power Line	152	161	134
Roadside	707	537	562
Children & Matches	1,154	766	748

STATEWIDE FOREST FIRE SUMMARY — 1970

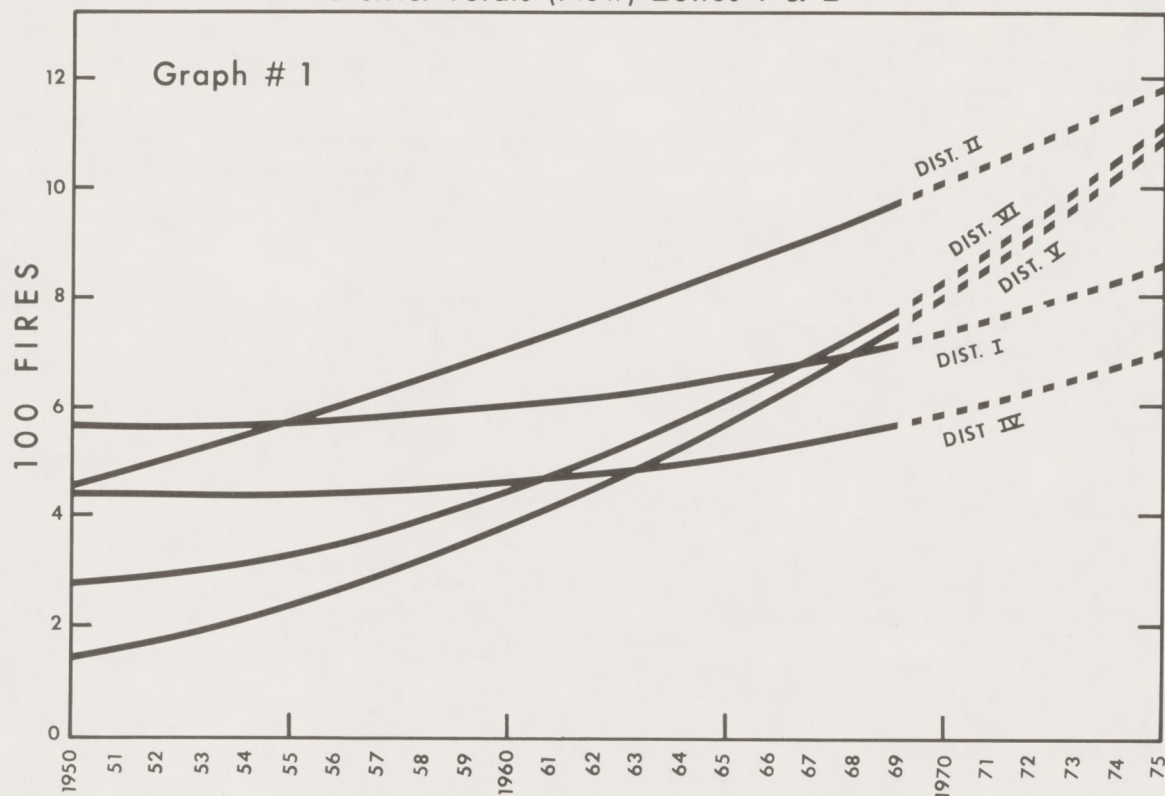
	Fires	Acres
California Division of Forestry		
Total This Year	5,216	223,279
Total Last Year	4,397	78,890
5-Year Average	3,978	140,710
U. S. Forest Service		
Total This Year	2,386	298,992
Total Last Year	2,249	19,554
5-Year Average	2,119	60,068
Bureau of Land Management		
Total This Year	63	120
Total Last Year	34	79
National Park Service		
Total This Year	162	4,438
Total Last Year	194	56
*Contract Counties		
Total This Year	1,684	228,696
Total Last Year	1,555	19,373
Statewide		
Total This Year	9,511	755,525
Total Last Year	8,429	117,952

\*Kern, Los Angeles, Santa Barbara, Ventura, Marin.

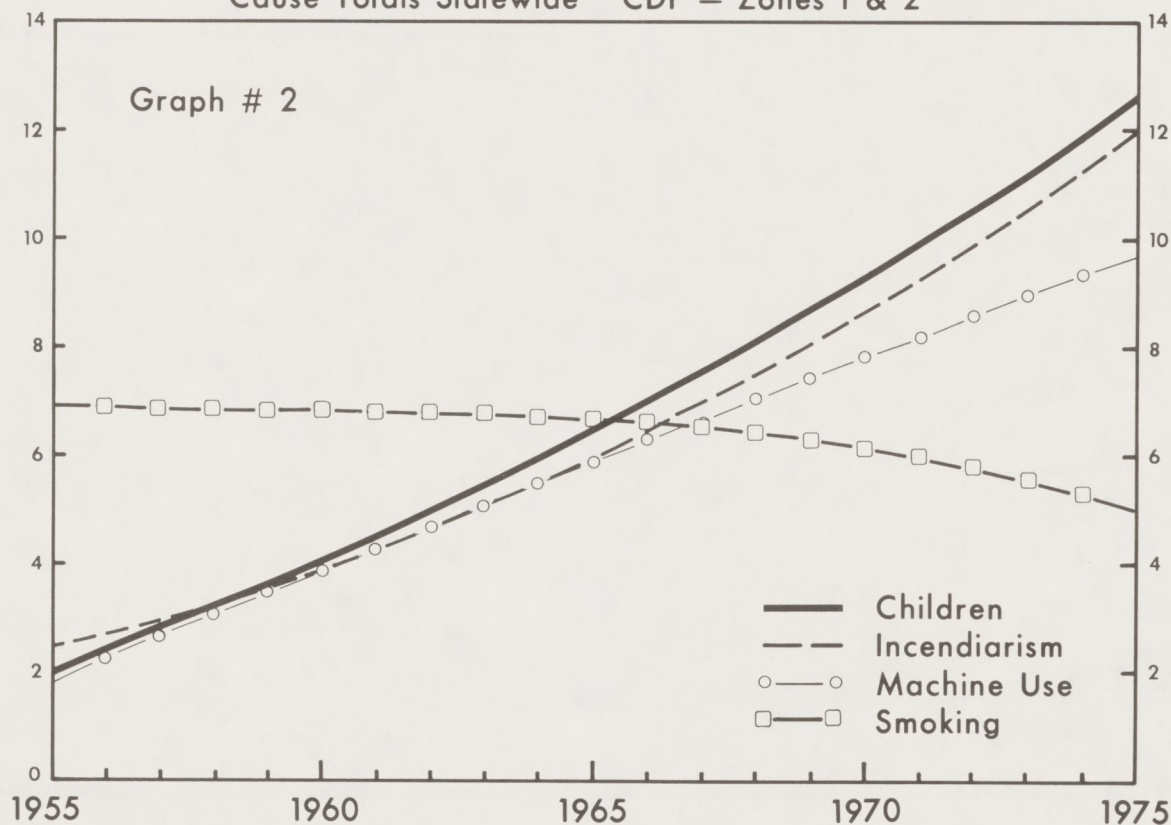


Long-term trends in fire causes are being analyzed in order to plan more effective fire prevention programs and activities for the future. The first graph below shows District comparative long-term trends of forest-type fires. The second graph indicates the rapidity with which children, incendiary, and machine-use fires are increasing, while smoker fires are on the decline.

### MAN CAUSED FOREST FIRES District Totals (New) Zones 1 & 2



### MAN CAUSED FOREST FIRES Cause Totals Statewide CDF — Zones 1 & 2





## Information and Education

The California Fire Prevention Committee has now been expanded to 512 members. The membership consists primarily of commercial, industrial, public utility, civic, association, and public agency organizations.

In May the Committee's Northern California 1970 Annual Award, the Smokey Bear Plaque, was presented to Newton Steward, Vice-President of the California-Oregon Radio Company (KIEM-TV & KRED Radio, Eureka), for outstanding public fire prevention accomplishments, by Bettie Kempster of the California Federated Womens Clubs, Junior Membership (1969 awardee).



Also in May the Committee's Southern Award was presented to William Hanna of Hanna-Barbera Productions, Inc. (creators of Yogi Bear, Flintstones, Hamm's Beer Bear, Sniff & Snuff) by Clair Ghylin of Standard Oil of California.



At the meetings Chairman Francis Raymond discussed environmental problems and then introduced Deputy State Forester Howard E. Moore and Assistant Regional Forester Norman Farrell who discussed their respective agency fire problems. Russ Nagle of Foote, Cone, and Belding Advertising Agency gave the main presentation covering the National Cooperative Forest Fire Prevention Program. Assistant Deputy Burns then previewed the Division's films.

The Northern meeting was hosted by Len Quever of the Pacific Telephone and Telegraph Company in San Francisco. Maury Croson of Southern California Edison in Los Angeles hosted the southern meeting. The Committee is very appreciative of the many courtesies extended by these hosts and their companies.



An additional feature of the Southern Meeting was the presentation by State Forester Francis Raymond of an award to George Fox, President of Public Services Films, Inc., for the Sniff and Snuff movie "Keep It Green" from the National Committee on Films For Safety. A special Certificate of Appreciation was presented by Francis Raymond to Wetumka Moffatt of the Golden Empire Council, Boy Scouts of America (Sacramento), for their cooperation in the production of a 60-second Boy Scout fire prevention television spot.





Deputy State Forester Mike Schori presented the annual Fire Prevention-Education Award to the Yuba City Junior Women's Club at Disneyland in June. This is a special award reserved each year for one of the 236 hard-working Junior Women's Clubs in California. These young women are looking for club work to do in the Conservation and Fire Prevention fields.

CFPC member Joe DeLucchi initiated "Smokey Bear Night" at the five major league baseball parks last year. The local State Ranger and an employee in the Smokey costume participated along with Fire Prevention Officers Ernest, Bolster, Griggs, and Jaseau.

Director Stearns and Deputy Schori each participated on program. Mr. DeLucchi took part in all the programs. The "Fireman of the Year" (best relief pitcher) was chosen for each home club and a fireman's hat awarded to him. A Certificate of Appreciation was given to each California ball club. The program proved very popular and will be continued in 1971.



Director Stearns and Joe DeLucchi present an award to San Diego Padres manager Preston Gomez.



CFFP Committee, San Diego, March, 1970. L to R Ray Bell-State Forester of New Mexico, Jack Gillete-State Forester of Idaho, Ralph Winkworth-State Forester of North Carolina, Sam Cobb (ret) State Forester of Pennsylvania, Merle Lowden, Chief, Division of Fire Control, Forest Service, and Mal Hardy, Director of the CFFP program, Washington D.C.

In March the San Diego Ranger Unit and the Cleveland National Forest co-hosted a two-day field tour of the Cooperative Forest Fire Prevention Committee in their respective protection areas. The Committee, consisting of four State Foresters and three Forest Service Division Chiefs from Washington, D.C. (Fire Control, State & Private, and Information & Education) met for two days previously to plan the 1971 campaign along with representatives of the volunteer advertising agency Foote, Cone, and Belding and the Advertising Council.



The 1970 film production for the Division by Public Service Films, Inc., was a 4½-minute color animation of Sniff & Snuff "On the Moon." Three 60 second, three 20 second, and three 10 second television spots were made from this featurette and distributed to all television stations in California (and also to one in Medford and one in Reno). The story line was by George Fox and the art work by Hanna-Barbera Productions, Inc.



Fire Prevention Officer Walt Bolster revised a brochure explaining the California Fire Prevention Committee "Cooperating in Fighting Forest & Watershed Fires Before They Start." He also initiated and edited a newsletter for the Fire Prevention Committee. Jerry Brown, Senior Delineator, designed a brochure that shows the fire prevention materials created by the Division of Forestry (as opposed to Smokey Bear's CFFP materials) for use by Division employees as well as Fire Prevention Committee members in ordering stock.

The Pre-School and Early Elementary Conservation and Fire Prevention Education program (formerly called Headstart Program) was put into operation in Marin, Sonoma, Napa, and a portion of Humboldt Counties during 1970 with the help of the Redwood Region Conservation Council and referred to as "Operation Springboard." A drop in wild-caused fires was noted in these areas. Fire Prevention Officers Ernest and Griggs modified the program and produced a Teachers Packet designed to be sold to school districts at \$6.00 a copy. The packet is at the State Printers and will be sold during 1971 and as long as it is in demand.

The first formal Fire Prevention-Education School was given in a week-long school at the Fire Academy in December. The instructors, headed by Deputy Moore, were Assistant Deputy Burns and Fire Prevention Officers Ernest, Griggs, Ford, Jaseau, and Diltz. These schools will be a semi-annual event. A fire information service school is being put together by Ernest, Ford, and Diltz to be given during 1971.

In December Deputy Howard Moore moderated a fire prevention presentation to the State Board of Forestry. The subject matter revolved around the volunteer fire prevention program participation on the part of citizens in Southern California. Panel members were A. F. "Bud" Van Horn, Executive Secretary, Keep California Green, Inc.; Sam Tanksley, Assistant Chief, Los Angeles County Fire Department; Don Porter, Assistant Chief, Information & Education, Forest Service; Rex Griggs and Walt Bolster, Fire Prevention Officers, Division of Forestry.

Deputy Moore attended the annual meeting of the National Association of State Foresters in Santa Fe, New Mexico, last September as Chief Deputy Lewis Moran did not want to leave during the period of fire conflagrations. Moore also was a guest instructor for the North Carolina Forest Service during their annual Ranger training school in October.

Assistant Deputy Burns presented a paper "Combating Special Fire Prevention Problems in California" at the annual convention of the Society of American Foresters in Las Vegas last October. He also presented a paper titled "Letting Smokey Bear Work For You" at the U. S. Forest Service's first "National Smokey Bear Workshop" in Atlantic City last January.

Fire Prevention Officer Dick Ernest attended the Cooperative Forest Fire Prevention Committee's annual meeting in Washington, D.C. last April as a guest of Smokey Bear. He also arranged a half-hour taped television program for the California Farm Bureau Federation's program "Voice of Agriculture" featuring Deputy John Hastings. This program, covering fire control, was viewed throughout the State. Ernest along with Assistant Ranger Frank Holbrook, Amador-El Dorado Ranger Unit, acting as Smokey Bear, put on a program for the wives of California legislators.

Fire Prevention Officers Dick Ford (chairman), Dick Ernest, and Rex Griggs revised the Fire Prevention-Action form. The new form should be in use during 1971. Ernest (chairman), Ford, Griggs along with FPO Jaseau completed the Education and Information Handbooks. They have been distributed to the field.



San Diego County's Miss Flame and Smokey Bear visited the San Diego Naval Hospital to cheer up Vietnam veterans on December 11. The next day they called upon the Children's Hospital at Sharp Memorial Hospital and Smokey was as popular as Miss Flame had been the day before.

### Fire Prevention Engineering

Work has continued with the railroads to reduce fire occurrence on rights-of-way. At the end of 1970 over 600 non-turbocharged locomotives have been equipped with approved spark arresters. The source of carbon particles in turbocharged locomotive exhausts was tracked down to a crankcase eductor tube in the exhaust after the turbine fan. The largest railroad instituted a program, though late into the fire season, of cleaning the tubes. An immediate reduction of fires was noted prior to the time the right-of-way was cleared.

The Division was requested by the American Association of Railroads to assist them in drawing up specifications for locomotive spark arresters which would be effective nationwide. The final specifications recommended to the Association very closely follow those we submitted which in turn parallel California's Public Resources Code.

The Administrative Regulations covering hazard reduction on electrical utilities were changed as a result of tests conducted in 1969. A new revised Power Line Hazard Reduction was issued to reflect the changes.

A Fire Safe Plan was instituted by Pacific Gas and Electric Company covering all their recreation areas and campgrounds. The plan covers all aspects of the Fire Safe Program which could be applied for each area.



A paper on "Fire Hazard Reduction of Rights-of-Way" was presented to the International Shade Tree Conference, meeting in Pasadena in 1969. Members of the Conference include railroads, electrical utilities, and many State highway departments. At this particular meeting a large number of County Public Works or Road Departments from California were also represented.

Small, hand-held extinguishers continued to be tested to find the best ones for users of gasoline powered tools. Despite the good marketing possibilities, most manufacturers of the best larger extinguishers are not interested in producing an extinguisher in the one-pound range. Many small extinguishers are on the market, but for the most part, the extinguishing agent is not satisfactory for the type fires which are likely to be started by gasoline powered tools.

The characteristics of carbon particles as firebrands are being studied as a part of the fire prevention research program. The end result is to find at what distance certain size particles can be ejected from an exhaust system and not start a fire, considering both the engine exhaust temperature and weather conditions normally encountered during fire season. Fuel beds of native vegetation (or ground litter) will be used. One interesting sidelight found during the analysis of diesel engine carbon is that one of the two types (soft) is made up of about 30 percent engine fuel by weight.

A Los Angeles based company, primarily engaged in manufacturing heavy-duty oil and air filters, some of centrifugal force design, is currently developing a spark arrester for trucks. The arrester uses the principle of centrifugal force plus screen capable of withstanding high temperatures. At the request of the company, the Division has acted in an advisory capacity during field tests and the later development of the arrester. When ready for manufacture, the arrester should be less expensive and easier to maintain than present arresters on the market.

Through reassignment of duties, two Fire Prevention Officers, one in Riverside and one in Fresno, now have primary duties in the field of Fire Prevention Engineering. The work conducted by these men at this level has been greatly needed, particularly in the fields of industrial engineering and mechanical equipment.

## • MANAGEMENT SERVICES •

The Management Services Section of the State Forester's staff provides essential assistance and services to other staff sections in developing management plans and carrying out managerial activities. Particular areas of responsibility include collecting and analyzing data; estimating costs; budget planning and preparation; and support and assistance in optimum utilization of resources, especially manpower. Management Services also assists and provides guidance in purchasing; storing supplies and equipment; and in property and records management.

## Manpower Utilization and Personnel Management

During 1970 there were 300 new permanent appointments to fill vacant positions in the Division. On December 31, 1970 there were 2,575 year-long employees, and at the peak of fire season total employment reached 4,468 including seasonal Apparatus Engineers and fire fighters.

The 1970 State Legislature enacted legislation which will enable Division of Forestry fire suppression classifications to retire at an earlier age and with a higher allowance. The new retirement formula makes it possible for Forestry employees to retire at half-pay with 25-years of service at age 55 (the actual formula is 2% per year of service after reaching the age 55), with maximum benefits limited to 75% of final compensation. Legislation was also enacted establishing the maximum age for taking an entry examination into Forestry fire suppression classifications at 31-years. Stringent physical retention standards are being developed for employees after reaching the age 55. It is anticipated that these new standards will become effective in 1972. This retirement program change will enable the Division of Forestry to have a stronger, more youthful, and aggressive force for combating wildland fires.

Thirty-three employees retired during the year; thirteen for disability reasons. Among those retiring were five completing long careers with the Division.

F. H. Raymond, State Forester and Executive Officer, State Board of Forestry retired after completing over 39 years with the Division. A graduate from the University of Colorado with a B.S. Degree in Forestry, Mr. Raymond started his career in June 1931 as Assistant Ranger in Monterey County. Subsequently, he spent two years as an Assistant Forest Technician at the Sacramento Headquarters, and seven years as Ranger-in-charge of Monterey County. From 1943 to 1953 he was Deputy State Forester in charge of the North Coast District. In 1953 he was appointed Chief Deputy State Forester and in 1955 he replaced DeWitt Nelson as State Forester, when Mr. Nelson was appointed Director of the Department of Conservation. Mr. Raymond was President of the Association of State Foresters during 1963.

Fred M. Dunow, Deputy State Forester, retired after 38 years and 9 months of service. After graduating from the University of California with a B.S. Degree in Forestry, Mr. Dunow started his career with the Division as a Truck Driver in Butte County in June 1931. After progressing through the ranks of Assistant State Forest Ranger, State Forest Ranger and Forest Technician, in May of 1943 he was appointed Deputy State Forester in charge of the Central Sierra District where he served until his retirement.

Jack A. Kessler, State Forest Ranger III, retired after 34 years and 1 month of service. Mr. Kessler first worked for the Division as an "Assistant Leader" in July 1934. After performing in various capacities throughout the State, he became Ranger-in-charge of Amador Ranger Unit June 1, 1953. From 1957 to November 1970, he was Ranger-in-charge of the Sonoma Ranger Unit.



### Law Enforcement

Civil enforcement actions during the year closed 186 cases and recovered \$340,401.66 in fire suppression costs pursuant to Section 13009 of the Health and Safety Code. Civil actions pending settlement at year's end involved suppression costs in excess of \$3 million with four cases involving various electric utilities scheduled for trial early in 1971.

Criminal prosecutions were increased by approximately 3% in 1970 to a total of 421 cases. Convictions were obtained in 9 out of every 10 misdemeanor prosecutions and 7 out of every 10 felony actions initiated. Juvenile cases in 1970 were about 50% below the 1969 level.

Investigative teams were assigned to assist in arson investigations in Nevada and Contra Costa counties. Sufficient evidence was gained by the team in Nevada County to bring the suspect to trial. He was sentenced to the state penitentiary for a period of 1 - 10 years.

The arson suspect in Contra Costa County set a number of early season grass and structural fires. Initial team investigation failed to produce sufficient evidence. During a period of critical fire weather the suspect became active again. Incendiary devices were recovered and sufficient evidence obtained for an arrest. The suspect was in jail at year's end awaiting trial having been charged with setting 22 fires, one of which resulted in a 213 acre fire in the Berkeley hills just north of the University Campus that destroyed 37 houses (damage estimate \$3,000,000).

Enforcement personnel swung into action again in September in Southern California. Intensive uniformed patrol in marked vehicles was initiated in critical areas adjacent to major fires in San Diego County to prevent and deter additional incendiary activity. Local police agencies were fully involved at the time handling evacuation of families in the fire path and to prevent looting of abandoned homes. Plainclothes investigative teams concentrated on prompt investigation to determine cause, origin and identification of the person responsible for causing the fire.

Significant environmental legislation establishing a statewide Air Quality Control Board was passed. Restriction of open debris and agricultural burning was extended statewide. The net effect upon division operations will be a reduction in the number of burning permits issued accompanied by an increased effort in coordination with both air and water quality agencies.

Incendiary bombs and high explosive bombs plus protest, dissent, and revolutionary activity resulted in new explosive legislation at both the federal and state levels. The Division no longer issues explosive permits but is still responsible for enforcement of the Fire Marshal's regulations governing the purchase, storage, manufacture and use of high explosives in state responsibility areas. Permits for explosive transportation became the exclusive jurisdiction of the Department of the Highway Patrol. All other explosive permits are now the responsibility of the local police agencies. Coordination on fire safety standards required for use of explosives must be worked out at the local level between fire and police agencies.

William F. Mann, State Forest Ranger III, retired after 28 years and 5 months of service. Mr. Mann was appointed in April 1942 as Associate State Forest Ranger in Madera County. He served in Placer, Butte, Yuba and Sacramento Counties prior to his appointment as Ranger-in-charge of Lassen Ranger Unit in May 1945. Subsequently, he served as Ranger-in-charge of Tulare and Mendocino Ranger Units until September 30, 1970.

70 after completing  
were:

Albert V. Feudner, Storekeeper II

William J. Shimer, Assistant State Forest Ranger

Roma McGinty, Heavy Fire Equipment Operator

Allan J. Hayes, Associate State Forest Ranger

Alonzo E. Jordan, Fire Crew Foreman

Stuart T. Stuver, Equipment Maintenance Foreman

Charles C. Dewhirst, Fire Captain

Walter F. Church, Fire Captain

Joseph W. Weselsky, Assistant State Forest Ranger

Peter Calandra, Assistant State Forest Ranger

Frank W. Jenkins, Assistant State Forest Ranger

Floyd J. Brandt, Carpenter I

Ethel N. Urban, Forestry Cook I

Earl H. Boren, Fire Crew Foreman



A paper on "Fire Hazard Reduction of Rights-of-Way" was presented to the International Shade Tree Conference, meeting in Pasadena in 1969. Members of the Conference include railroads, electrical utilities, and many State highway departments. At this particular meeting a large number of County Public Works or Road Departments from California were also represented.

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William Siler, State Forest Ranger III, started his career in July 1933 as a Truck Foreman in Napa County. He worked in many northern California assignments, culminating in his appointments as Ranger-in-charge of Humboldt Ranger Unit in 1945. After almost 35 years of service he retired as Ranger-in-charge of the Tehama Ranger Unit.

William F. Mann, State Forest Ranger III, retired after 28 years and 5 months of service. Mr. Mann was appointed in April 1942 as Associate State Forest Ranger in Madera County. He served in Placer, Butte, Yuba and Sacramento Counties prior to his appointment as Ranger-in-charge of Lassen Ranger Unit in May 1945. Subsequently, he served as Ranger-in-charge of Tulare and Mendocino Ranger Units until September 30, 1970.

Others who retired during 1970 after completing careers with the Division of Forestry were:

Donald A. Swain, Forestry Equipment Engineer

James A. Broderick, Groundsman

Tracy A. Bushnell, Forestry Superintendent,  
Conservation Camp

Harry C. Proctor, Fire Crew Foreman

Geno Toschi, Fire Apparatus Engineer

Clyde R. MacGregor, Fire Captain

Donald C. Mott, Fire Apparatus Engineer

Bert V. Starr, Heavy Fire Equipment Operator

Francis D. Thompson, Fire Crew Foreman

Edgar D. Spaulding, Fire Crew Foreman

Otis Bowne, Fire Captain

Ecks V. Nesbitt, Stenographer II

Curtis E. Johnson, Fire Captain

Richard A. Groninger, Forestry Superintendent,  
Conservation Camp

Albert V. Feudner, Storekeeper II

William J. Shimer, Assistant State Forest Ranger

Roma McGinty, Heavy Fire Equipment Operator

Allan J. Hayes, Associate State Forest Ranger

Alonzo E. Jordan, Fire Crew Foreman

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Ethel N. Urban, Forestry Cook I

Earl H. Boren, Fire Crew Foreman



## DIVISION OF FORESTRY BUDGET - Fiscal Year 1970-71

### Summary:

	\$ 2,554,977
(1) Fire prevention: state responsibility	32,733,084
(2) Fire control: state responsibility	8,419,209
(3) Fire protection: local government contract	2,137,870
(4) Forest, range, and watershed management	4,509,703
(5) Conservation camp	306,185
(6) Civil defense and other emergencies	3,956,253
(7) General support	397,393
(8) Capital outlay	
Sub-total	\$55,014,674
Reimbursement	10,927,153

TOTAL NET BUDGET      \$44,087,521

### Program Changes:

1. Mandatory or critical State needs resulted in the following:

- |  |              |
|--|--------------|
| a. Diversion of funds to provide for an improved retirement plan   | \$ 1,400,000 |
| b. Deletion from Division of Forestry's proposed budget as as result of Legislative action.                  | 1,400,000    |
| c. Administrative adjustment to return funds to the State General Fund to meet the needs of higher priority. | 600,000      |

2. Delineated below are program changes initiated to provide for the needs set forth in Item 1 and redirection of Division efforts for effective utilization of available funds to accomplish the program objectives:

- |   |               |
|---|---------------|
| a. Redirection of equipment replacement funds.  | -552,000      |
| b. Redirection of Capital Outlay funds.   | -605,000      |
| c. Redirection of Forest and Fire Research funds.   | -65,000       |
| d. Redirection of savings in staff benefits as a result of Forestry retirement system members being excluded from OASDI.  | -300,000      |
| e. Closure of the District III Headquarters.  | -276,000      |
| f. Ranger unit consolidations.  | - 74,000      |
| g. Conservation Camp staff reductions.  | -255,000      |
| h. Increased reimbursements for protection of the Bureau of Land Management lands.  | -125,000      |
| i. The U. S. Forest Service allotment was reduced by \$33,000 as a result of the State providing fire protection to the Westwood-Chester area.  | - 0 -         |
| j. The remaining savings required in providing for the needs delineated under Item 1 will be generated through delayed hiring of personnel, freeze on equipment purchasing and miscellaneous operating expense savings. | \$ -1,074,000 |



## ENGINEERING & CONSERVATION

### • CAMPS •

The Engineering and Conservation Camps activity performs in a dual role. Engineering and construction responsibilities are principally concerned with establishing and maintaining standards, and performance of necessary work related to land acquisition; mapping and surveying; graphics, and design, construction, and maintenance of facilities.

The Conservation Camps are operated jointly with the Department of Youth Authority (wards), and the Department of Corrections (inmates). They are designed to provide a living-and-working experience in a beneficial outdoor environment that will be conducive to rehabilitation of wards and inmates assigned to the camps. In addition they function to provide an essential trained force that is highly effective for fire fighting and other resource protection and conservation work.

#### Engineering and Construction

The old Klamath Forest Fire Station, leased from the U. S. Forest Service, was replaced by new facilities on a new site slightly northeast of the original location. A second new forest fire station, identified as Robinson Mills, was constructed in Butte County and replaces the former Hurleton Forest Fire Station. The Anza Forest Fire Station in Riverside County, originally operating out of a World War II surplus building, was replaced by new construction. Two new barracks buildings replaced old facilities, and two barracks buildings were completely remodeled. Other improvements made to the Division's facilities included a new messhall, several paving projects, extensive revision of electrical systems, a new residence and residence remodels, improvement of communication facilities, and site development.

Water development projects provided nine 10,000-gallon cisterns, as well as development at two forest fire station locations.

The Division is continuing maintenance of 101 bridges throughout the access road net which now totals 3,894 miles of administrative roads and truck trails.

Telephone line mileage now totals 890 miles.

A considerable amount of effort was expended by Forestry's Delineation Unit in preparing a fire prevention packet designed for use in the early elementary

grades. This modified the initial package and reduced the cost of production by one-half.

Five administrative maps have been revised, a new map of Santa Barbara County was produced photo-mechanically through use of U. S. Forest Service originals.

Sixteen special maps were prepared, including a new map of the Mountain Home State Forest.

The Division of Forestry has received fee title possession of five forest fire station sites previously leased.

The number of rights-of-way processed during 1970 slightly exceeded 200 - up somewhat from 1969.

#### The Conservation Camp Program

The number of conservation camps in operation in 1970 did not change from the 1969 total of 33. However, the complement of inmates for the 29 adult camps was reduced from 2,380 to 2,190. The four youth conservation camps retained the same complement of 320 wards.

Inmate quotas were reduced at the following camps, effective October 1, 1970. A resultant reduction of 19 Fire Crew Foreman and six Assistant State Forest Rangers (Assistant Superintendent) was necessary.

Conservation Camp	Inmate Quota		C.D.F. Personnel Change	
	1969	1970	F.C.F.	A.S.F.R.
Alder	80	60	2	1
Antelope	100	80	3	
Baseline	100	80	2	
Cuesta	80	70	1	1
Eel River	100	80	1	
Inyo-Mono	80	60	2	1
Magalia	80	60	2	1
Parlin Fork	80	60	2	1
Plum Creek	80	60	2	
Prado	100	80	2	
Totals			19	6

With the change from six districts to five, a shift of the supervision over some of the camps was necessary in order to equalize the administrative work load.

#### Revised Distribution and Population of Conservation Camps

District	No. of Camps	POPULATION			
		Wards	Inmates	Total	Change*
North Coast	7	-	520	520	-80
Sierra Cascade	8	80	520	600	-40
South Sierra	7	160	400	560	-20
Central Coast	3	80	130	210	-10
Southern California	8	-	620	620	-40
Totals	33	320	2,190	2,510	-190

\*Effective October 1, 1970



The new Pine Grove Youth Conservation Camp in Amador County, which was completed and occupied in 1969, was formally dedicated on May 9, 1970. All of the camps, which used surplus military or other temporary type structures, now have been replaced with modern buildings.

The following list of major emergencies will serve to illustrate the diversity of the assignments given to inmates and wards in the camps.

*Crews spent 1,198 man-days on flood-fight work during January and February.*

*During June, over 300 man-days were used to remove an estimated 70 tons of dead fish from the Salton Sea State Recreational Area in Riverside and Imperial Counties.*

*Fire line work is expected each year, but the 13-day period beginning on September 22 and ending on October 4, was a time which taxed all of the capabilities of everyone in the Division of Forestry. In addition to the 137 regular crews that are normally available, 826 additional men were dispatched to the fire lines. These men came directly from the medium security institutions. All of these emergency fire fighters, as they are called, performed well above the level for inmates who have not had the physical conditioning training which the regular grade crews receive.*

*After the fires were out, the follow-up task of reseeding the steep, barren slopes before the winter rains created mud slides and floods, had to be done. The camp crews contributed 1,214 man-days of work towards the successful completion of this gigantic aerial reseeding project.*



Snow removal from roofs of state buildings at Squaw Valley.



Inmates working on oil slick near Santa Barbara.

#### Work Performed by Conservation Camps During 1970

<u>Activity</u>	<u>Man-days</u>	<u>Percent of Total</u>
Wildfire Suppression, Mop-up, and Patrol	103,614	13.46
Presuppression and Facilities	94,027	12.21
Fire Defense Improvements	157,263	20.42
Forest, Range, and Watershed Management	28,159	3.66
In-Camp Projects	44,231	5.74
Camp Services	150,323	19.51
Building and Equipment Maintenance	55,929	7.30
Training	13,526	1.80
Game and Fish Habitat Improvement	10,322	1.10
Public Campground & Recreational Dev.	46,204	6.00
Search and Rescue	1,435	.20
Other Services	65,069	8.60
Totals	770,102	100.00



● PUBLICATIONS OF 1970 ●

Activities of the Division are reported, and results of research made available in a variety of publications. Those listed below were distributed during 1970. They were prepared by members of the Division, or resulted from cooperative projects with other agencies. All are directly related to work with the Division of Forestry.

**Papers and Reports Processed by Division and Department**

"Annual Report of Forest Fire Research, 1969-70." California Fire Control Notes No. 24, 11 pp.

"An Unusual Thunderstorm Pattern," by William Ahl, Rex Hess, and William Innes. California Fire Control Notes No. 23, 7 pp., illus.

"California's 1969 Fire Weather Severity," by Milo Radulovich and William Innes. California Fire Control Notes No. 22, 5 pp., illus.

"Combatting Special Fire Prevention Problems in California," by Robert Burns, paper presented at 1970 National Convention of Society of American Foresters, Las Vegas, 18 pp.

"Cooperating In Fighting Forest & Watershed Fires Before They Start" a revision, a description of the public and agency fire prevention program, 1970. 20 pp.

"Project Butte" by Howard E. Moore, California Fire Prevention Note No. 5, 1970. 10 pp.

"An Inspection Program" by Hugh M. Maguire, California Fire Prevention Note No. 6, 1970. 5 pp.

"Pre-School and Early Elementary Conservation and Fire Prevention Education Program," a teacher's packet, collected and edited by Richard Ernest and Rex Griggs, 1970.

"California Conservation Camp Program--1969." 70 pp.

"Annual Forest Practice Report --1969." 7 pp.

"Brushland Range Improvement--1969." 18 pp.

"California Cone Crop for 1970," by C. J. Eden. State Forest Note No. 41, 9 pp.

"California State Forests - 1969." 12 pp.

"Emergency Revegetation of Burned Watersheds - 1969." 9 pp.

"Forest Nurseries, Annual Report, 1969-70," by C. J. Eden. 8 pp.

"Production of California Timber Operators in 1968," by Daniel Dotta. State Forest Note No. 39, 6 pp.

"Reforestation Studies, 1969," by Ronald S. Adams. 23 pp.

"Board Foot by the Pound," by David M. Burns. State Forest Note No. 42, 4 pp.

"Pruning and Shearing and Knobcone x Monterey Pine Hybrid for Christmas Trees," by Robert E. Rappleye and J. C. Borden. State Forest Note No. 43, 8 pp.

"Ball and Chain Brush Crushing," by Richard Gilbert and Jef Schmidt. Range Improvement Studies No. 19, 8 pp.

"Forest Practice Rules for Redwood Forest District," 1970 Edition, 65 pp.

"Forest Practice Rules for Coast Range Pine and Fir Forest District," 1970 Edition, 59 pp.

"State Forest Regulations," 1970, 7 pp.

"The Brush Disc - an Effective Tool for Brushland Range Improvement," by W. James Clausen, Richard H. Bawcom, and Franklin F. Frank. Range Improvement Studies No. 20, 5 pp.

**Publications Resulting from Cooperative Effort of Division**

"Advanced Concepts for Forest Fire Command and Control Systems," by Frederick W. Bratten. Proceedings of 20th Ann. Conf. For. Cons. Comms. Assn.

"An Experimental Prescribed Burn to Reduce Fuel Hazard in Chaparral," by Lisle R. Green. U.S.D.A. Forest Serv., Berkeley, Ca., Res. Note PSW-216, 6 pp., illus.

"Building Fire Lines - How Fast Do Crews Work?," by James L. Lindquist. Fire Technology (2):126-134, illus.

"Computer Time Sharing - a New Tool for Foresters," by James B. Doris and Bradley B. Nickey. Jour. of Forestry 68(1):21-23.

"Establishing and Maintaining Fuel Breaks with Chemicals," by Lyle McCutchin. Ind. Veg. Manage 2(3):2-5, illus.

"Foliar Spraying of Sprouting Tanoak Plants Best in Summer," by Kenneth M. Estes and David A. Blakeman. U.S.D.A. Forest Serv., Pacific SW Forest Range Exp. Sta., Berkeley, Ca., Res. Note PSW-207, 4 pp.



"Olfaction in Rodent Control," by W. E. Howard and R. E. Marsh. *Proceedings of Fourth Vertebrate Pest Conference*, March 1970, West Sacramento, Calif. pp. 64-70.

"Forest Pest Conditions in California - 1969." California Forest Pest Control Action Council - California Division of Forestry, 24 pp.

"A Procedure for Systematically Fitting Local Volume Functions Using Orthogonal Polynomials," by L. C. Wensel and J. Van Roessel. *Forestry Chronicle*, Vol. 46, No. 3, June 1970. 4 pp.

"Spawning Bed Sedimentation Studies in Northern California Streams," by James W. Burns. *California Fish and Game* 56(4), October 1970. pp. 253-270.

"Fenceposts Butt-Soaked in Pentachlorophenol still sound after 22 years" by Don A. Duncan and Harold W. Wolfram. *Pac. SW For. & Range Exp. Sta. Research Note PSW-221*, 1970. 3 pp.

"Findings and Recommendations on Sediment Problems in the Trinity River near Lewiston and a Summary of the Watershed Investigation." Task Force Report to the Secretary for Resources, Resources Agency, Jan. 1970. 32 pp.

"Studies on the Population Dynamics of the Western Pine Beetle, *Dendroctonus brevicornis* Le Conte (Coleoptera: Scolytidae)" by R. W. Stark and D. L. Dahlsten, Univ. of Calif. Press 1970.

"Moisture Contents of Brushland Fuels Dessicated for Burning," by Stanley B. Carpenter, Jay R. Bentley, and Charles A. Graham. *U.S.D.A. Forest Serv., Pacific SW Forest and Range Exp. Sta., Berkeley, Ca., Res. Note PSW-202*, 7 pp., illus.

"Nitrate Poisoning, Fire Retardants and Fertilizer - Any Connections?" by Marvin Dodge. *Jour. of Range Manage.* 23(4):244-247.

"Perennial Grasses Reduce Woody Plant Seedlings - On Mixed Conifer Fuel Breaks", by Harry E. Schimke, Lisle R. Green, and Danny Heavilin. *U.S.D.A. Forest Serv., Pacific SW Forest and Range Exp. Sta., Berkeley, Ca., Res. Note PSW-203*, 4 pp., illus.

"Prescribed Fire for Maintaining Fuel Breaks in the Central Sierra Nevada," by Harry E. Schimke and Lisle R. Green, *U.S.D.A. Forest Serv., Pacific SW Forest and Range Exp. Sta., Berkeley, Ca., 9 pp., illus.*

"Relation of Plastochron to Anatomy and Growth in the Shoot Apex of *Chrysanthemum*," by Arthur R. Berg, *Amer. J. Bot.* 59(1):24-32.

"Systems Analysis and the Fire Department," by James B. Davis, *Fire Journal* 64(2):84-87.

"A Study of the Effectiveness of Television Teaching of Conservation and Forest Fire Prevention in Kindergarten and First Grade of Selected Schools in Northern California: 1969 & 1970," by Frank H. Gladin and Helen S. Carkin, *U. S. Forest Service, PSWF&RES*, and California Division of Forestry, 50 pp.

"You and Nature" by State-Federal Resources Information and Education Officers Council, 1970, a foldout.

"Forest Fire Fighting Fundamentals," a reprint, joint U.S. Forest Service and California Division of Forestry training book. 58 pp.

"California Timber Industries - 1968," by B. R. Barrette, D. R. Gedney, and D. D. Oswald. California Division of Forestry.

"California Tree Seed Zones," by John M. Buck et. al., California Division of Forestry and California Region, U. S. Forest Service.

"Influence of Soil Water on Root Growth Capacity of Ponderosa Pine Transplants," by Edward C. Stone and James L. Jenkinson. *Forest Science*, Vol. 16, No. 2, June 1970.

"A Diphacinone Bait for Deer Mouse Control," by W. E. Howard, R. E. Marsh, and R. E. Cole. *Journal of Forestry*, Vol. 68, No. 4, April 1970.

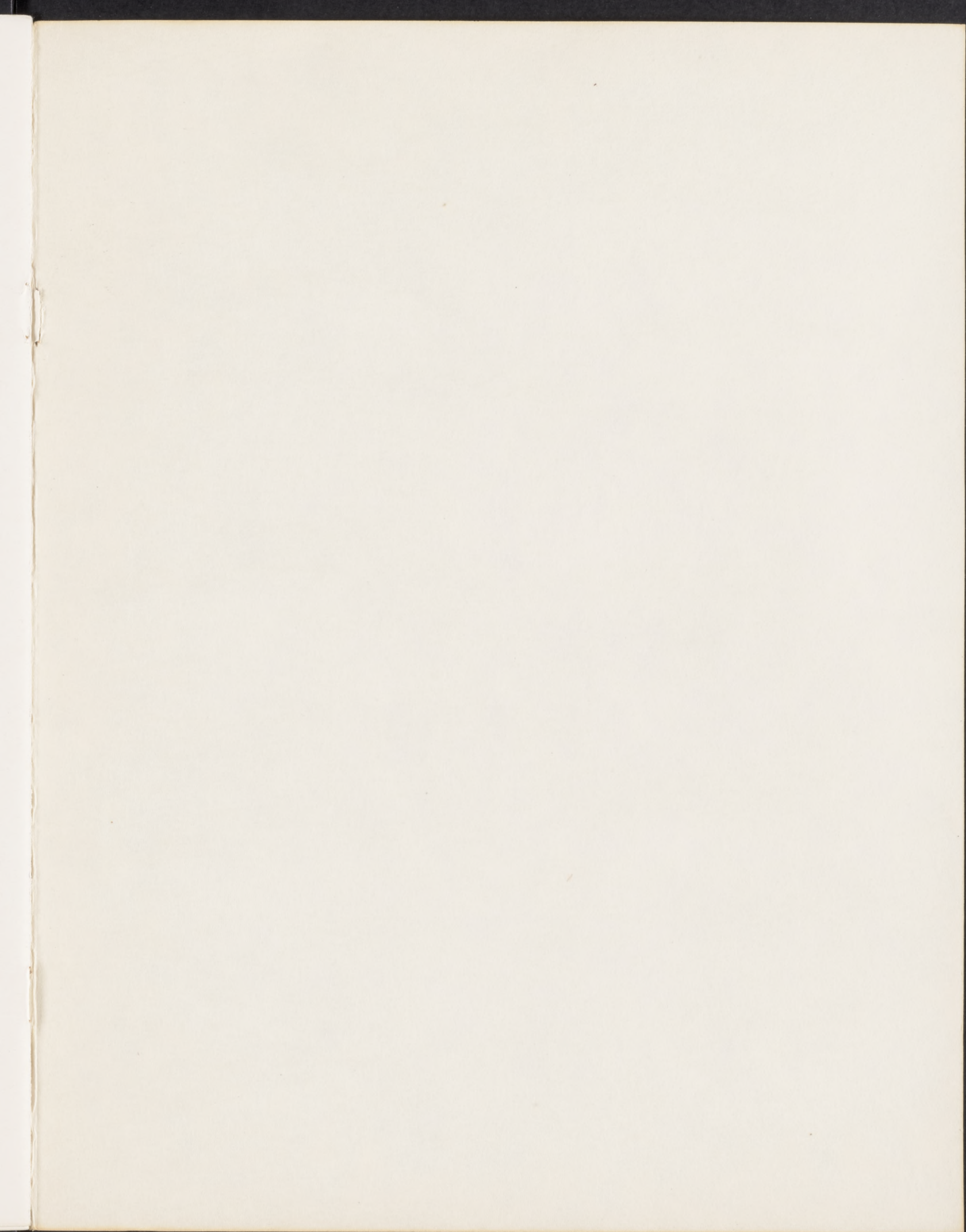
"Predation by Deer Mice on Great Basin Tent Caterpillars is inconclusive," by R. E. Marsh, W. E. Howard, and R. C. Hall. *Journal of Economic Entomology*, Vol. 63, No. 2, Feb. 1970.

#### Printed Articles and Books (by Division Personnel)

"State vs Local Forest Practice Regulations in California," by T. F. Arvola. *Journal of Forestry*, Vol. 68, No. 11, Nov. 1970.

"California Conifers in Containers," by Ronald S. Adams. *Proceedings of 1969 Annual Meeting of Western Reforestation Coordinating Committee*, Spokane, Washington, Dec. 2, 1969. pp. 38-40.







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